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AMERICAN POTASH INSTITUTE, INC.
INVESTMENT BUILDING **WASHINGTON, D. C.**

Better Crops with PLANT FOOD

The Whole Truth—Not Selected Truth

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Editorial Office: Investment Bldg., Washington, D. C.

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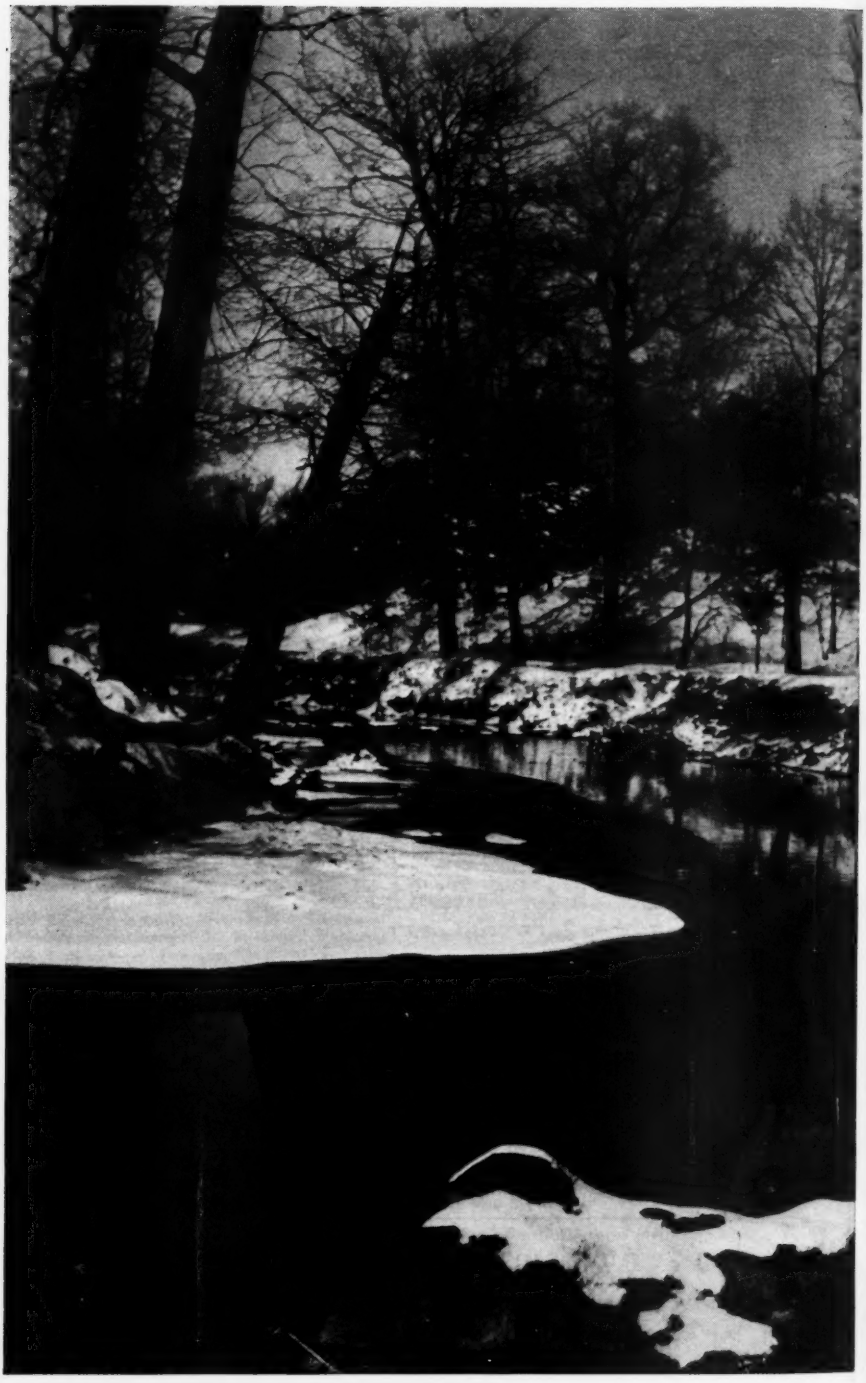

"HALF AND HALF," AS WINTER GIVES WAY TO SPRING

Better Crops with PLANT FOOD

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VOL. XXV WASHINGTON, D. C., FEBRUARY 1941 No. 2

Let's enlarge the scope for—

Valentines

Jeff McDermid

EXPLANATIONS are perhaps obligatory from a husband who has enjoyed twenty-five years of wedlock in good standing without sending his wife a valentine—or buying a ticket to Reno either. But on the other hand, the woman who wears my ceremonial ring does not have to yank the fluttering petals off a daisy, one by one, to determine the reason why I persistently hang around the kitchen when she is presiding there.

Not that this is going to be a lurid confession story sent to the wrong magazine—far from it. We have never kept a maid and we do not flavor our viands with alcoholic tonics, so neither scandalous triangles nor dizzy circles explain my preference for the sanctum of domestic economy—and she knows it.

What she also knows is that I am uncommonly unhandy with carving and casserole cooking; that I am not to be trusted over much with can-openers or egg-beaters; and that I wipe dishes with the same ferocious zeal which I put into shaking the furnace.

She often remarks that it is amazing that we still possess all our wedding set of spode and limoges, after a quarter century of this dinner-hour diligence of mine. For, she says, I have worn out three or four grates, stripped the gears on at least one auto and a couple of sewing machines, and burned holes in rugs faster than she can hook 'em.

Nevertheless, she is never heard lamenting about my lapse of memory or my sagging sentiment anent the subject of Valentines. Scraping dishes, sopping up sinks, and planning meals for a fam-

ily diverts the mind from lovers' knots and forget-me-nots. Unless perchance, like many other bygone brides, this duty-laden helpmeet of mine occasionally finds Cupid in the cupboard and bliss in beaten biscuits.

Whether she does or not, I do at any rate. To me, who seldom sends Valentines, a spell spent in the wifely workshop is worth hours hunting up lyrics in a library. The brown hair of thirty years ago is more charming than ever, tinged slightly with strands of silver. If worry or bother took the pigment from her brow, so much the more is that a mark of noble resignation. The brown hair I used to see was a promise, the gray hair of today is fulfillment.

Hands that remain dainty and flexible and capable after being denied so much of the help they could have hoped to receive; shapely feet that have clambered along a rougher road than the bridegroom ever intended; and eyes which stay serene despite this present world of dreadfulness—what kind of gaudy mercantile Valentine could be trusted to say it properly anyhow?

Neither can you march right out into the kitchen and tell her that pointblank. It would be harder than doing the original asking. She would sniff and toss her head at first—disdain amid the doughnuts—but if persisted in for very long, I am sure there would be a quick call put in for the village doctor. It won't do to unload a batch of delayed sentiment all in one delivery, either written or verbal. Minds have cracked for less cause than that. Or she would think it a reflection on her cookery and blame it at once on something I had "et."

VALENTINES are usually regarded as being anonymous tokens of regard, which partly absolves me from sending any. If I remain sort of anonymous under my present authorship it seems sufficient without cluttering up the mails with lackadaisical correspondence.

Yet nothing prevents me from looking backward toward the times when Valentines meant something in my charmed scholastic circle; and then perhaps to give you an inkling of some anonymous tokens of regard which I might send if I had enough jack left on February 14 after Christmas bills and tax receipts come in.

Back in the "golden rule days" the missives we sent by way of the handy class-room post-office were of two kinds —the heart-throbs and the slanderous comics. I suppose these are still in circulation the same old way by the same old route, but only those with grade school youngsters are privileged to see much of them. I used to go by myself and distinctly on the sly select my heart-throb specimens, but I was glad enough to go along with the fifth ward gang when the choice of comics was in order.

WHEN driven by silent adoration to express myself in somebody else's melting meter, I sidled into the long aisles of the dingy store on Main street, and by slow degrees nonchalantly strolled over to the Valentine counter. If there were no girls of my own age hanging around, I sampled the saccharine specimens carefully, in an effort to obtain as much red-hot blandishment as possible for a small outlay of cash. If two or three giggling and cold-snuffling females were poking at the piles of lacey gems, I hastened to transfer my attention to the Nick Carter dime novel rack until they had gone. Some of the girls bought Valentine materials and toted them home for sticking and trimming. Not me—I had too many teasingly inquisitive members in the family. I chose to buy my sizzling sentiment right off the griddle and put it in secret cold storage so it would keep sweet until the day of dispensation.

But it was the zero hour of juvenile justice indeed when we smeary-faced urchins met at the store after school to pick over the flimsy lithograph monstrosities done in sickly and poisonous hues on longish strips of cheap print paper. We had no secrets then. We pooled our power-house of mean ideas

and helped each other paw over the fearful litter in search of the most lurid, damnable, and ire-provoking insults possible to find on short notice.

Sometimes we were needlessly unkind and brutally thoughtless, such as when we conspired to send a Valentine about Dowdy Dora to a spinster teaching our class in mathematics, who had to scrimp and save and make over her clothes so as to keep a brother in college; or that Foolish Phiz cartoon sent to a lad with rather vacant mentality.

Yet looking at it as a whole, I verily believe some of those sallies on Valentine day were laudable correctives to smart alecs and bullies. The thing which gave them a special bang was the fact that they came from unknown sources, having something of the stern disciplinary influence of fate or the natural elements. One who received a critical analysis of his mood, manner, or character in this frank and vigorous fashion took it to heart perhaps more effectively than if his Sunday school teacher had tried to point a moral with it; and certainly it got by better than a curtain lecture at home. In fact, I knew a few incorrigible nuisances who were much improved and toned up after getting a barrage of caricatures in the w. k. schoolroom mail box.

ON the Fourteenth of the month everybody was on the *qui vive* for the closing hour of school, when teacher declared the "ballot box" closed and time to "count returns." Among the girls the sport was to see who got away with the most Valentines. The boys, with those comics impending, vied to see who got away with the most mischief.

There was for one short season, I recall, a certain blonde young miss sitting ahead of me whose long braids were forever slapping about among my pencils on the knife-scarred desk. Some girls less amiable and comely might have tempted me into tying erasers and paper strips to those golden locks just a foot or so before my eyes; but I held her in constant calflike reverence and awe. If she dropped a slate or a tablet I was the first to see and retrieve it. On a few rare occasions at recitation I was able to give her the right answer in a hoarse whisper.

I never went to any parties with her; never wrote her any notes; and never walked with her along quiet streets, carrying her books while she carried my heart. But her back hair got into my lessons and her soft accents got into my life for awhile, both of which were equally disturbing for at least one term in the sixth grade. Then she up and moved to Kansas.

BEFORE that Valentine day forty years ago when she was foremost on my horizon, every time I looked up for eight hours a day (and a good share of the other hours), I wrestled over the deep mystery why a member of our gang could so easily become a backslider and a renegade. I did not choose to bear the stigma of a sissy chaser when there was so much more invigorating sport to be found at the ball ground or the boat house. Yet I watched the advent of February 14 with mingled shame and daring. That date would tell my fate.

And lo and behold, it did. I have never been the same man since. Not that the mawkish little fluttery card I sent her counted up much in her collection, but it separated me from a hoydenish time of boyhood wherein manly ideals of pirates and robber caves and buried treasure crowded out all taints of softer things. Not that I once and for all divorced my lovelorn soul from the community of comrades known as "Chuck" and "Barrel Head"

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Right: cotton without potash in the top-dresser showed rust, potash hunger, and yielded only 740 lb. seed cotton per acre. Left: where 100 lb. muriate of potash was added to the side-dresser the cotton showed no rust and yielded 1,260 lb. seed cotton per acre.

The Cotton Program in Bertie County, N. C.

By B. E. Grant

County Agricultural Agent, Windsor, North Carolina.

INDICATIONS are that Bertie County averaged a bale of cotton per acre in 1940 for the first time in its history. When the beautiful fields of stalks of medium height laden with fluffy white bolls were contrasted to the 1939 cotton fields of excessive stalk growth but few bolls, courage and determination that cotton can still be produced in North Carolina were renewed.

In 1939 Bertie County planted the smallest cotton acreage and made the smallest average yield of any year recorded. With an allotment of approximately 10,000 acres, less than 6,000 acres were planted and only 1,862 bales produced, an average of 164 pounds lint per acre. After making two very short crops of cotton in succession, many Bertie farmers said they did not intend to plant any in 1940 since they had lost money on both the 1938 and 1939 crops. During the past 17 years cotton production has been a major extension project in the County, but we had begun to wonder if we were justified in continuing to make it a major project.

In 1939 Bertie County farmers planted 10,000 acres of tobacco, whereas the tobacco allotment for 1940 was 5,802 acres. The difference in acreage planted in tobacco for the two years was about the same as the difference in the allotment and planted acreage in cotton for 1939. With tobacco exports sharply curtailed, little hope could be

held out for much increase in the price for tobacco even with the reduced production. We realized that our farmers would need an additional income to take the place of the tobacco taken out of production.

Based on the results of demonstrations conducted on Bertie farms and in other counties, along with experimental evidence, an educational program was put on which included: The Agricultural Conservation Program and the benefits from it; production of ample food and feed supplies on the farm; use of good cotton land for cotton; use of certified Coker-100 seed; moderate fertilization; pre-square poisoning; and organization of one-variety communities.

In the educational work with the Agricultural Conservation Program, we explained the cotton payment, which includes the parity payment and the conservation payment, and that the combined payment amounts to approximately 3c per pound which producers who comply with the program are sure of getting, regardless of the crop actually produced as a result of weather, insects, and other hazards. The regulations that any farm having a cotton allotment will lose its allotment if no cotton is planted for three consecutive years were explained.

Farmers were urged to produce all the food and feed crops needed and that could be produced economically, including ample corn and hay, a year around garden, plenty of pork for home use and some for sale, and more milk cows to supply the farm families with milk and butter.

As a part of the cotton project we have conducted cotton variety tests on Bertie farms during most of the past 17 years. When these variety tests were started, most of the cotton planted was inferior gin-mixed varieties with a staple of $\frac{7}{8}$-inch and less. We were advised that most of the mills in North Carolina used cotton of $1\frac{5}{16}$ to $1\frac{1}{16}$-inch staple. The Experiment Station and plant breeders furnished us seed of improved varieties to use in comparison with each other and with local varieties. These variety tests showed that we could produce as good yields of lint of the staple length desired by North Carolina mills as from the inferior and gin-mixed seed.

Cotton-mopping demonstration on J. B. Wadsworth's farm at Woodville, N. C.

During the early years of this work, it was evident to us that under weevil conditions we needed earlier maturing and dwarfer growing varieties than those in use at that time, so we have constantly been on the lookout for such varieties. When the Coker-100 variety was first used in these variety tests, it appeared to come nearer reaching this ideal than any other variety we had used. Accordingly, we began to advocate the use of this variety, and in 1937 we assisted farmers in getting 163 bushels of pedigreed Coker-100 direct from the breeder, with the request that seed stocks be saved to furnish other farmers.

In 1939 two such variety tests were conducted on Bertie farms. These were conducted on C. B. Griffin's farm at Woodville and Dr. Wayland Mitchell's farm near Powellsville. In each of these tests Coker-100 Strain 2 was the leading variety, and so in 1940 we concentrated our efforts in getting the maximum acreage planted in certified seed of this variety. Accordingly, Bertie farmers, ginners, supply merchants, and fertilizer dealers were assisted in getting 2,500 bushels of certified Coker-100 Strain 2 from Union County. In addition to this, 500 bushels of certified Coker-100 Strain 1 and about 200 bushels of pedigreed Coker-200 Strain 1 were secured. With the Coker-100 seed already on Bertie farms, practically all the cotton grown in the County in 1940 was of the Coker-100 type. Results from the three variety tests and the yields on Bertie farms indicate that no mistake was made in making this selection.

Seed Treatments Beneficial

Many times we have seen farmers plant their cotton and get such a poor stand that the crop had to be planted over or else cultivated with such a poor stand that maximum yield could not be secured. Sometimes this would be from failure to get a sufficient stand of plants to emerge and other times from the plants dying after coming up during cold weather. For a number of years we had treated the seed with Ceresan and observed that a better stand of stronger plants was obtained from the treated seed. In late winter of 1936, we decided that enough preliminary work had been done to justify an educational campaign on seed treatment. For conducting this campaign, we had a barrel seed treater made and

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Using surplus cotton to make mattresses for low-income farm families.

A 25-lb. rate of borax applied to the plot on the right eliminated "alfalfa yellows" and produced a more vigorous, healthy growth.

Use Boron and Potash For Better Alfalfa

By R. W. Donaldson

Agricultural Extension Service, Amherst, Massachusetts.

BORON as well as potash appears to merit attention in fertilizer practice for alfalfa on some Massachusetts soils. A definite response secured this past season from applications of borax in control of "alfalfa yellows" substantiates for this area similar findings reported previously in other regions. Moreover, local trials showed that where a deficiency of boron is manifest in an alfalfa stand, ordinary applications of muriate of potash do not replace a need for extra borax applications.

The field trials which I mention now were simple pilot plots applied November 1939, the Massachusetts Agricultural Experiment Station and several county agents cooperating. Sixteen fields of alfalfa were selected at random, but representing several soil types ranging from coarse sandy to those of heavier loams. Each trial consisted of a strip on which borax was applied at a 25-pound rate, crossed by a similar strip on which muriate of potash (60%) was applied at a 300-pound rate to the acre. No attempt was made to restrict the owners from superimposing their own top-dressing treatments.

The spring crop which followed showed no visible effect from either the borax or potash applications. This first cutting grown under favorable moisture conditions developed normal healthy

growth in all cases with no sign of yellowing.

It was a little surprising, though, not to find some response from our potash applications. However, upon questioning the owners, we learned that all these fields had been top-dressed by them in the spring. Their treatment, for the most part, had been fairly liberal in minerals. It included muriate of potash, 200 to 300 pounds to the acre, which in some cases had been an annual practice of the past several years. This may explain in part our failure to obtain response to the extra potash.

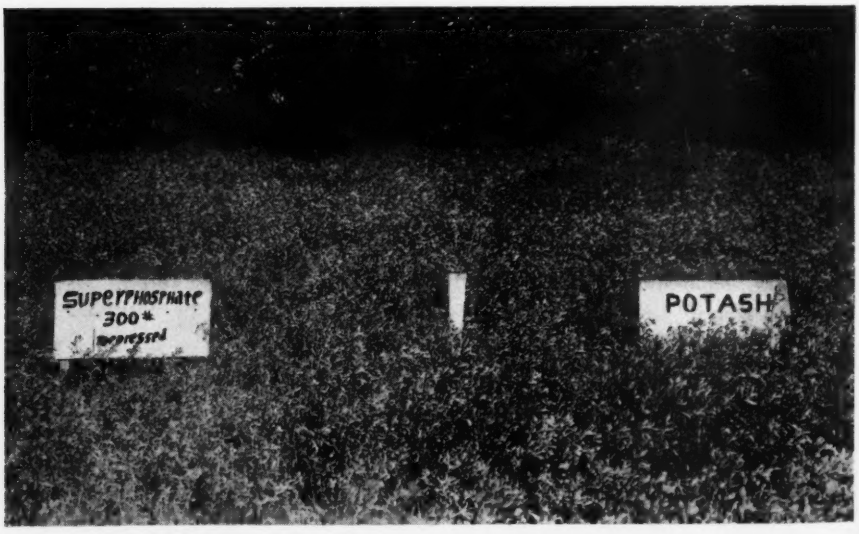
Yellowing Appeared

"Alfalfa yellows" appeared in the second crop and again in subsequent growth on about half the fields. The symptoms observed were a yellowing or occasionally a reddening of the terminal leaflets, accompanied by more or less stunting of plants and shrivelling of the terminal buds. These symptoms were more evident at maturing stages of the crop.

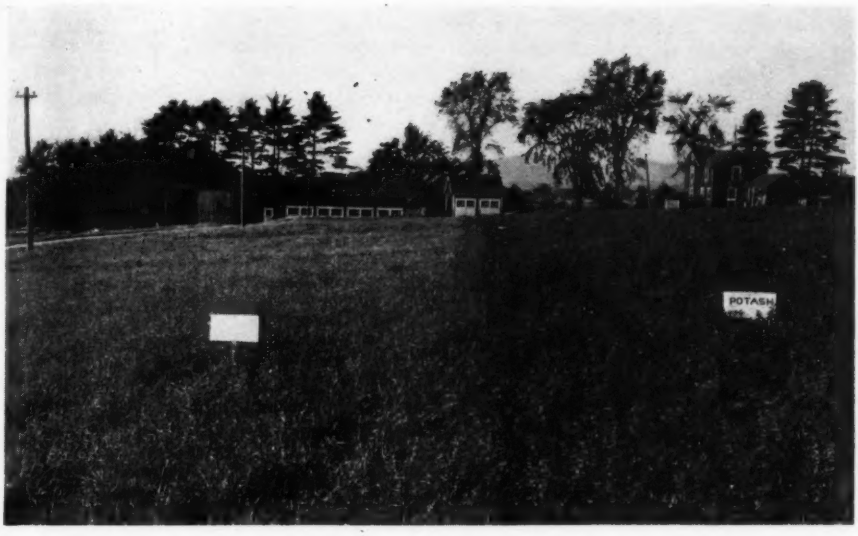
In contrast with unhealthy appearance of these stands, the borax-treated plots stood out in marked relief, having healthy, dark green color and taller growth. This contrast reappeared on the third crop and in late November, long after killing frosts, the taller stems still marked the plots of borax applications.

Only one field showing "yellows" failed to give response to the 25-pound rate of borax applied. Leafhoppers, or an insufficient rate of borax in this particular case perhaps due to heavier liming, or some other factor, may have been the cause.

The fields which developed trouble and gave response to borax were all located on the lighter soils. Moreover, the appearance of the symptoms of deficiency coincided with periods of drought. There was little rainfall for the latter half of June, and the period from late July until autumn frosts was abnormally dry. The remainder of the fields included in these pilot tests showed no evidence of alfalfa yellowing, nor were borax applications on these soils of noticeable value in this one season's tests. Since a majority of these unaffected fields were located on somewhat heavier soils and may have suffered less from lack of rainfall, one infers that lack of moisture is a predisposing factor of boron deficiency.



Comparison of a 300-lb. treatment of superphosphate with a 300-lb. treatment of muriate of potash after three seasons. Crop shows most effect from potash.



A 300-lb. rate of muriate of potash top-dressed annually on half of this area at the right produced the above results in four years on the College farm—a gain of 3½ tons more hay per acre and a productive stand for further yields.

A somewhat better comparison was available in another trial to indicate a need for borax on plots of alfalfa which had shown marked response to moderately heavy rates of potash fertilization. In this case, the alfalfa plots had been top-dressed annually for three successive years with muriate of potash (60%) at 300-pound rates and with triple superphosphate (47%) at 130-pound rates, each applied alone and in combination. Across these plots and to include the check, a treatment of borax was superimposed for observation in the third year of trial.

In this set-up, a very marked response in alfalfa growth had been obtained from potash compared with other treatments. However, alfalfa yellowing was evident here. It appeared more or less uniformly on all the plots after the early cutting except where the borax had been applied. This experience tends at least to strengthen an opinion gained from observations of our pilot plots, namely, the characteristic symptoms of yellowing may occur despite ordinary practices of mineral fertilization, but may be controlled through use of borax.

Many workers have shown that only very small amounts of borax are required to correct soil deficiencies of boron. On soils which require boron, as little as 5 pounds or less up to amounts of 50 pounds to the acre, as a rule, supply the need, depending upon the tolerance of the particular crop and upon the time and the method of application. Injury to plants may occur from an overdose, and this seems especially true of applications made at time of seeding.

How Much to Apply

For example, two years ago one trial was conducted in which borax was broadcast at the time of seeding in varying rates up to 50 pounds to the acre. The period was July and included a seeding for each of alfalfa and Ladino clover, located on a heavy limestone soil with the pH around the neutral point. Observations made during the remainder of that season showed retarded growth and white marginal scorching of the leaves on both of these seedling legumes as well as on seedling weeds where the amounts of borax applied exceeded a 30-pound rate to the

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Good pastures mean cheap feed for dairy cows and beef cattle. Thanks to research, cattle are going to better and better pastures.

Florida's Search For Better Grasses

By J. Francis Cooper

Agricultural Experiment Station, Gainesville, Florida.

IT took American farmers 150 years to learn that grass, which the forefathers found growing abundantly in this country, is still the best thing to grow on many thousands of acres. Generation after generation of cotton farmers, particularly, have fought grass with untiring energy, plowing and hoeing row crops to get cash with which to purchase meat and other needed supplies.

Former Secretary Wallace has compared grass to the locks which gave Samson his strength, and said that farmers have been lured by the Delilah of profits to shear these locks and thus have lost strength as a result. "A countryside shorn and stripped of this thick green grass, it seems to me, is weakened just as Samson was," he says. "An agriculture without grass loses a primary source of strength. Like Samson, it is in danger of falling a prey to destructive forces."

Farmers are learning the value of grass, are counting it now as one of their important crops. And grassland conferences held during July and August at the behest of the Department of Agriculture have called additional attention to this new, yet centuries old, crop and have reviewed research with it to date and laid plans for expanded investigations.

The Florida Experiment Station has made prolonged studies of grasses and their management and has secured much worth-while information about them, as have many other research institutions throughout the country. The Florida workers have tested many kinds of grasses to find those best adapted to different uses and have studied various fertilizers and management practices.

Following the political injunction to "get down to grass roots," Dr. W. A. Leukel several years ago built what he called a "showcase" for studying the growth of grass roots without having to pull up the grass. This apparatus for spying on the roots consisted of compartments about five feet deep and two feet square, with one side of each compartment glassed in. Removable panels were placed over the glass, the compartments were filled with soil, and the grass was started in them. The panels could be removed. and the grass roots observed through the glass.

Dr. Leukel noted effect on root growth of different fertilization practices and methods of handling the grass—frequent mowing, less frequent mowing, and no mowing. He found that sometimes in the spring the roots of Bahia grass grow as much as five feet in five weeks, and that the roots often grow to depths of eight feet. This is one of the reasons why Bahia has proven so desirable for high, dry lands—if there is any moisture to be found, the Bahia roots will find it.

Cows grazing Napier grass at the Florida Experiment Station.

Native Grasses Not Best

Grasses have abounded in Florida, as elsewhere, since before the white man came to its shores. The Florida cattle industry, founded largely on native grasses, has been an important one for 150 years. But wiregrass, which covers the great majority of the State's native range lands, is not the most desirable type for grazing purposes. It provides succulent grazing for a few weeks in the spring and early summer and then becomes tough and unpalatable. From 10 to 20 acres of native range, except in prairies and other favorable locations, are required to supply grazing for one cow during the year.

Progressive cattlemen have long desired more nutritious grasses which would provide grazing over a longer period. And research workers have sought them incessantly for several decades.

The Florida Experiment Station has maintained a grass garden for more than 30 years, where it has tested hundreds of different kinds of grasses. Many of them have been introduced by the U. S. Department of Agriculture from other countries throughout the world, as a part of its plant exploration and introduction work that has established dozens of new crops in this country. When new grasses have shown promise in the grass garden, they have been given wider trials on farms before being finally accepted in the State's agriculture.

W. E. Stokes, head of the Station's agronomy department, says that Bahia grass was first tested in 1914 and Napier in 1915. Both have since come to occupy important places in the pasture and forage program of Florida cattle-

men, Napier becoming fairly widespread by 1920.

Napier is a native of Tropical Africa. Mr. Stokes says it is the heaviest yielding grass yet tested at the Florida Station. It is a tall, rank grower somewhat resembling small canes and is satisfactory for soiling (cutting and feeding green), silage, and supplementary pasture purposes. It is killed by continuous close grazing, but thrives under rotational grazing. It can be propagated by seed, divided root clumps, or by planting partially mature canes. It is usually planted 3 to 4 feet apart in rows 7 to 8 feet wide. Being a perennial, one planting will last indefinitely if not overgrazed.

All told, the Florida Station has tested several thousand strains of Napier supplied by the U. S. Department of Agriculture. Some of the strains have been subject to a leaf spot disease. Disease resistant strains with good forage characteristics have been selected, multiplied, and distributed to farmers.

Bahia, also a perennial, is a native of South America. Tested under Florida pasture conditions for the past 26 years, it has shown up exceptionally well, being second-best producer of beef. Its deep root system makes it desirable for higher and drier soils. In establishing it, best results have been obtained by broadcasting 15 to 20 pounds of seed per acre and covering very lightly, but solid plantings can be made.

In 1929 Dr. Leukel noted the growth behavior of Bahia grass plants which were cut frequently and those cut less frequently or only at maturity. The frequently cut plants maintained a more vegetative condition, were generally of a darker green color, and were vigorous in the production of new leafage and other vegetative parts. However, under adverse growth conditions at certain periods during the season, these plants sometimes showed a less vegetative condition than plants cut less frequently.

Plants cut in the seed stage were vigorously vegetative during the early part of the growing season and produced abundant leafage during this period. With the advance of the growing season, they became decidedly reproductive and ceased vegetative

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The best method of seeding Para grass is to scatter cuttings on the ground and disc them in. This grass is excellent feed. It is grown on fertile, moist soils of southern Florida.

Some Requirements of Fiber Flax

By W. L. Powers

Oregon Agricultural Experiment Station, Corvallis, Oregon

SUITABLE soil maintained in a good state of fertility and tilth is of primary importance in the successful production of fiber flax in the North Pacific Coast region. Progress has been made in recent years toward successful mechanization of harvesting operations, and modern scientific and mechanical skill should help to firmly establish processing and milling operations to provide local markets and manufacturing plants for flax produced. Flax-growing promises to provide an additional cash crop to the farmer, for which there should be a protected market in this country.

According to chief council for the U. S. Government at Belfast, the linen goods imported into this country annually have had a retail value of $25,000,000 to $50,000,000. The linen textile industry of Belfast alone is reported to employ 85,000 workers. The possibilities in flax and linen under western Oregon climate cause much interest, particularly since the European war has interfered with production and importation.

The general soil conditions suitable for fiber flax include good drainage, a good supply of nitrogen and organic matter, and slightly heavy textured soil such as silt loam, having good tilth, usable water capacity, and fertility. Early plantings on clean, well-prepared land seeded around March 15 to April 10 have been most successful. Supplemental irrigation has been very helpful, especially when there was dry weather in June. Early planting permits taking advantage of the spring moisture and moist atmospheric conditions in early season and brings on the "grand period of growth" during the longest days of the year, which was proved by Redington and Priestley (1925) to be important in fiber flax production.

The recently completed soil survey of the Willamette Valley and a study of the flax crops in recent years show there is an abundance of land suitable for fiber flax production in this region. Soils on the old valley filling or main valley floor well suited for fiber flax production include those of the Willamette series, and also the soils of the Amity series where needed drainage has been provided. The Willamette series includes 351,680 acres and the Amity series 277,568 acres, so that there are over half a million acres in the main valley floor capable of producing flax. Some of this land is now devoted to permanent crops These soils are suitable for flax growing about once in four years in a crop rotation that will include grain, clover, and a cultivated crop. The clover sod will supply nitrogen, and the cultivated crop helps to eliminate weeds.

Flax Soils Tested

It should not be difficult to find 50,000 acres a year of old valley filling soils that could be devoted to fiber flax, if market and economic conditions come to warrant it. The soils from flax contract fields were tested and found to be slightly to moderately acid, with 1 to 2½ tons lime requirement, and the available phosphate was moderate in amount, ranging from 25 (low) to 125 (good) pounds per acre to plow depth. The nearly available potassium (Neu-

bauer tests by V. C. Bushnell) ranges from 390 pounds in the surface 8 inches of Newberg fine sandy loam to 918 pounds in Chehalis loam studied. It appears 500 pounds or more are desirable for flax or potatoes.

The recent stream bottom soils include some good flax land, principally the soils of the second bottom of Chehalis series, with a total area of 218,715 acres. Flax has also been successfully grown on heavier textured soils of the Newberg series. There are approximately a quarter of a million acres of bottom land that would grow flax as cleared, of which perhaps 25,000 acres should be available for flax production annually in a 4-year rotation. It should not be difficult, therefore, to grow as much as 50,000 acres of flax on the main valley floor, or 25,000 acres on suitable bottom land, if market and economic conditions should come to warrant it. Robinson (1932) reported most of the fiber flax grown in Oregon was planted in three soil series with the following production: Chehalis—3,514 lb. per acre; Willamette—3,099 lb. per acre; and Amity—2,633 lb. per acre.

The Soils Department of the Oregon Agricultural Experiment Station has conducted field and plant house studies of the nutrient requirements of fiber flax during a period of 12 years. Review of the literature and early results obtained with several soils have been reported previously by Powers (1928 and 1936). Flax was grown in water cultures, soil plats, and field fertilizer trials with a view to obtaining information about nutritive requirements of this plant for maximum fiber production.

Potassium and nitrate were found to be especially needed, and potash was found important in the early growth period. Potash seemed to increase the yield and also length and strength of straw or fibers. The effect of nitrate on vegetative growth has been marked in some experiments. Nitrate appeared to increase fiber yield less than it did straw yield, while potassium seemed to affect fiber production more. There is also an indication that superphosphate is effective in increasing the seed yield, while potassium sulfate increases the ratio of fiber to that of seed.

Microscopic examination of many stained cross sections of fertilized and unfertilized flax stems and fibers shows that potassium increases the plumpness and causes wedging or crowding. X-Ray photographs, secured through the cooperation of Professor Dore of the University of California, show that no difference in individual cellulose units resulted from fertilization.

Field fertilizer and irrigation trials with fiber flax have been conducted for the past decade on Willamette silty clay loam in the irrigation field of the college farm, and results are summarized in Table I. Treatments were applied ahead of the flax crop in a 5-year rotation that included grain, clover, flax, potatoes, and corn. Including some

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TABLE I.—AN EIGHT-YEAR AVERAGE YIELD PER ACRE

Willamette Silt Loam—Irrigation Field, Corvallis, Oregon, Agricultural Experiment Station, Soils Dept.

Treatment	Average Yield	Average Net Gain by Irrigation	Average Gain by Fertilization	Average Gain Irrigation & Fertilization	Six-year Average Fiber Yield
	Tons	*Tons*	*Tons*	*Tons*	*Lb.*
Unfertilized	2.17	.90	....	....	613
Potassium Sulfate	2.31	.87	.14	1.03	624
Potassium and Nitrate	2.44	.81	.27	1.14	652
Potassium, Nitrate, and Phosphate	2.50	.74	.33	1.18	680
Average	....	.83	....	1.12	....

Just a little congestion at a State line, caused by variance in regulations regarding motortrucks.

Letting Down Barriers To Selling Good Crops

By C. B. Sherman

United States Department of Agriculture, Washington, D. C.

AFTER the farmers have raised their better crops, they sometimes come up against barriers to selling them in the very next State. If farmers live so near the boundary that their nearest natural market is in the adjacent State, this may be a serious matter. These barriers take different forms. In some instances the farmers just over the line may be blocked or penalized all along the way when they try to take or send produce to this market.

Regulations by States regarding motortrucks that come from beyond their borders are one of the forms of interstate trade barriers that affect perishable crops the most. Fruits and vegetables lend themselves readily to motortruck marketing. Increases in the quantities so marketed have been phenomenal during the decade. Many farmers depend entirely upon that means, and the distance that these perishables can be trucked in short time is noteworthy. It is a great and growing business, aided by the huge crops that have been grown in answer to the shift in diet toward fresh foods and by the widespread work to improve the quality of crops and shipment.

Yet this business is hampered just as soon as the motortruck must pass a State line, in many instances. A complicated maze of regulations and restrictions, differing in nearly every State, has been thrown up around many of the boundaries.

Several States make all motortrucks

that cross their borders register and pay a fee no matter how good or how needed the food they carry. Others make out-of-State trucks pay higher ton-mile taxes than trucks that use only State licenses. It may be argued, of course, that out-of-State trucks should contribute as much as home-State trucks towards maintaining the roads, and that they do not unless they pay the State registration fee, or a high-ton-mile tax. This argument may have some merit, but the special burden on truckers who cross the State line and who have already paid a registration fee in their own State remains. In some instances, farmers of good crops who depend on truckers from other States to come in and take their produce have protested against their own State laws that hinder interstate commerce by motortruck.

Equipment Regulations

Then there are a multitude of troubling regulations about lights, windshield wipers, defrosters, mufflers, locks and keys, bumpers, fuel tanks, steering gear, tool kits, and fire extinguishers. They may be so hard to keep up with and so hard to meet that a shipper gives up a market across a State line that may want the goods, and sends to another market in his own State that may be further away and perhaps oversupplied. This means waste in time and probably lower prices.

Under port-of-entry legislation several States have placed checking stations at points where main highways enter the State. Here officials stop incoming trucks and make detailed inspections, check for insurance coverage, and collect taxes that vary with weight of the vehicle and the distance it is to travel in the State. In some of these States, anyone driving a truck that does not have a State registration must fill out an elaborate form describing the truck and its load, the route to be taken, etc. One State has 66 ports of entry and there are 58 in another State. In a certain State two sheriffs ran for reelection on a platform that pledged non-enforcement of the motor-vehicle laws.

Next on the way to this market over the boundary comes the question of non-uniformity in State grade specifications, grade names, and grading legislation. This lack of uniformity confounds many growers and shippers, hinders trade in perishables, and causes endless annoyance. Any State grade definitions or packing or marking requirements that differ in any way from those required in other States lead in some degree to interference with the flow of goods into that State. This is the conclusion of investigators, yet there are comparatively few adjoining States that have exactly the same regulations in regard to grading, shipping, and marking perishables. State market officials are fully alive to this situation. They would like to work toward uniformity as rapidly as an informed public opinion in their States will allow.

Then when and if the produce actually reaches this near market across the line, it often faces further discrimination. A license fee to sell may be levied in excess of that charged to other sellers. Particularly is this true if the driver is selling produce beside his own, causing him to be known as a merchant trucker. Levying this larger fee may give most of the near producers a temporary advantage but it is likely to be a disadvantage to the distant growers in the State as well as those across the line, for most grower-truckers do not make long trips. They can't spare the time and they usually have small trucks not built for long hauls. An individual farmer in many instances does not have enough produce of his own to fill a truck at any one time.

Local-preference rules prevail in many markets. Space will allow only a few examples to be given. The trucker-dealer may use the Syracuse farmers' section of the regional market only if he sells produce grown in New York State. In the Farmers' Market at Hartford, Connecticut, only Connecticut-grown produce may be sold, although

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Meeting Fertility Needs in Wood County, Wis.

By H. R. Lathrope

County Agricultural Agent, Wisconsin Rapids, Wisconsin.

SOIL is Wood County's most valuable asset. The prosperity of the citizens of the County depends on the fertility of the soil. The wealth created in the County comes from the soil.

Soils in Wood County are of three major types. A large part of the heavy soil is known as Colby Silt. A belt running through the central part is known as Vesper Silt loam. Soils in the southern part of the County are composed of sand, peat, and muck. Most of the soils lack lime, phosphorus, potash, and nitrogen.

The problem of supplying these plant-food elements is an important one. Many farmers had hoped that if they continued in dairying, purchased some mill feeds, and took ordinary care of their barnyard manure, their soils would never become depleted. They are finding out that their soils are rapidly becoming depleted, in spite of good care of their manure and heavy purchases of mill feeds. Crop yields in many cases are too low for economical production of crops. Farms in Wood County have been operated only about 50 years. Soil tests show that already soils on many farms are hungry for potash, phosphate, lime, and nitrogen. It will cost money to supply these, but there is still time, and the returns at present prices of farm products will pay for the fertilizers and leave a handsome profit on most soils.

Fertilizer tests conducted during the past few years have demonstrated be-

Barley plot on Fred Hoefner's farm, Marshfield. Two hundred pounds of 0-20-20 increased grain yield 21.7 bu. and straw yield 860 lb. per acre.

La Verne Neve, 4-H Club member, in his hybrid corn plot. Two center rows fertilized with 3-12-12.

yond all doubt that there is a fertility problem in Wood County and that the increases in yields due to fertilizer applications will pay good dividends. Fertilizer demonstrations have been conducted at the Branch Experiment Stations at Marshfield and Hancock, Wisconsin. Valuable results have been obtained at these station farms. Many farmers from Wood County have attended "Station Days" at these Experiment Stations during the past 25 years. Many farmers have been wondering if the results obtained at the station farms could be secured on their own farms. Some have believed that their soils would not respond. Some did not have the ready cash to try out some fertilizer recommendations. During the past few years hundreds of Wood County farmers have become curious about their soil fertility problems and have brought samples of soils to the county agent's office for test. Several thousands of samples have been tested for phosphate, for potash, and for lime. As county agent, I have learned the areas where the poor soils as well as the better soils are to be found.

In 1940, 200 farmers and older farm boys cooperated with the county agent's office in conducting fertilizer trials on as many farms as there were cooperators. Soil tests were made on each of these 200 farms. Farmer cooperators were selected from among the AAA committeemen, older 4-H club boys, and young farmers who were interested in conducting a demonstrational enterprise in an effort to find out what is wrong with the soils and how they might be improved.

Fifty-seven older farm boys cooperated with the county agent's office in fertilizing 57 acres of 95-day hybrid corn. Fertilizer was supplied these farm boys, and for the most part it was applied with a hand planter and, in some instances, with a large spoon or trowel. Enough fertilizer was supplied each boy for 160 hills of corn in his acre hybrid corn plot. Outstanding results were obtained in practically every trial. A 3-12-12 fertilizer was applied at the rate of 175 pounds per acre. The fertilized row was selected in the middle of the field. An increased height of corn was apparent after the first two weeks. On August 3 some tall corn was brought in and judged by Professor Al. Cramer of the Wisconsin College of Agriculture. The tallest

corn measured 9 feet and 10 inches. The yields on these corn plots averaged 78 bushels per acre. Several plots, which were harvested, ran over 100 baskets per acre. One plot which was husked and weighed yielded 77 bushels per acre where the fertilizer was applied as compared to 41 bushels where no fertilizer was applied. The cost of the fertilizer was just $2.34. The owner secured corn at 6¢ per bushel charging the fertilizer to the increased yield.

Cooperative Demonstrations

One hundred older farm boys cooperated with the county agent on a demonstrational enterprise "Bringing Back Clover on Wood County Farms." For many years farmers have had difficulty in getting successful stands of clover or alfalfa. On testing the soils where the poor stands resulted, I found that they were lacking in potash, phosphorus, and lime. These 100 farm boys selected fields of new seedings of clover or alfalfa where they expected to have difficulty with stands in 1941. Through the cooperation of the American Potash Institute and the Tennessee Valley Authority, one 50-pound bag of 60% Muriate of Potash, and one 100-pound bag of 62% T.V.A. phosphate were allotted each boy. This material was applied on a 1-acre plot in the central part of at least a 5-acre field. Fifty pounds of phosphate were applied on a ½-acre strip and 50 pounds of potash and 50 pounds of phosphate were applied on the other ½-acre strip, leaving a strip of at least two rods wide between the two treatments. All of the boys, where the soil test indicated acidity, applied ground limestone or paper mill sludge to the entire 1-acre plot where the treatment was installed. All plots were staked out and a map made of the field and treated plots for future reference.

The boys and their fathers are anxiously awaiting the coming of spring so that they can determine the success or failure of the enterprise. The demonstrations are located in each of the 22 townships in Wood County. Each boy is pledged to make five representative sample cuts from the phosphate, phosphate and potash, and untreated plots and weigh them and record the yields. Already there is a keen County-wide interest in the demonstrations. If a majority of these plots show up better than the untreated plots, it

Peter Buteyn uses this hand applicator for spreading a 10-16-12 fertilizer on his meadow.

will give new hope and new inspiration to Wood County's agriculture.

Thirteen farmers cooperated with the county agent on a timothy hay improvement enterprise. Potash, phosphorus, and nitrogen fertilizers were applied on 1/10-acre plots. Three plots were installed on each of the 13 farms. Nitrogen was applied at the rate of 200 pounds per acre on all three plots. Phosphorus was applied at the rate of 100 pounds on two of the three plots. Potash was applied at the rate of 100 pounds on one plot so that there was a complete check on the value of the three fertilizers. The results were outstanding in every instance. On the W. G. Heuer untreated plot a yield of one-half pound green weight was obtained from 1/1000-acre plots (average of 5 cuts), and three pounds green weight were obtained where potash, phosphorus, and nitrogen were applied. An increase in green weight of nearly one pound was obtained on the average where potash was applied over the phosphorus plot.

Good Attendance at Meetings

More than 500 farmers attended meetings at these demonstrations. Fertilizers were applied on these timothy hay plots with a hand distributor 3½ feet in width. The 10-16-12 fertilizer analysis which was used gave such amazing results that hundreds of farmers have decided to use this combination on their night pastures and to pep up their timothy hay fields in 1941. The yield of hay was tremendously increased and the quality of the hay greatly improved. The hay on fertilized plots was more leafy, had a better color, and contained nearly twice as much protein when cut early as the hay cut on ordinary dates. The fertilized hay matured much earlier and permitted earlier cutting. The increase in feeding value of the timothy and the increase in yield of more than one-third in the fertilized plots over the unfertilized plots brought the demonstration farmers an extra 1½ to 2 tons of high protein hay on the first cutting alone. The second cut was equally as good and additional pasture was available on the fertilized plots. For the first time in the history of Wood County, timothy hay was made to grow so rank on the fertilized plots that it smothered out white and alsike clover. Increase in the rank growth of timothy was easily seen within 10 days after the application of the fertilizer, due largely to the nitrogen applied.

Seventeen farmers cooperated with the county agent in establishing fertilizer demonstrations on oats, barley, wheat, and rye. In these test plots, fertilizer was drilled in with the seed. A new combination drill furnished by the Oliver Company was loaned to the county agent for installing the demonstrations. Fertilizers were applied on Colby Silt loam, Vesper Silt loam, and the Sandy soils. The drill was towed behind the county agent's car for more than 1,000 miles in order to get the fertilizers applied at seeding time. Check plots of one rod in width were left on each field. On each of the 17 farms, ½-acre plots were installed, using 0-20-10 fertilizer and ½-acre plots using 0-20-20. In practically every instance the addition of double the amount of potash brought an increased return over 0-20-10, indicating that potash is necessary for the economical production of oats, barley, wheat, and rye.

Good Money Returns

Five 1/1000-acre cuts were taken from each plot as well as from the unfertilized plots. Sample cuts were dried out in burlap bags (heads down) and threshed at the Wisconsin College of Agriculture. Yields were computed from each threshed sample. The cost of the fertilizer was charged against the increase in yield and the additional value of the straw. The lowest return over the cost of the fertilizer was $3.36 while the highest was $21.63 on the 0-20-20 combination. No value could be attached to the increased yield of the

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PICTORIAL

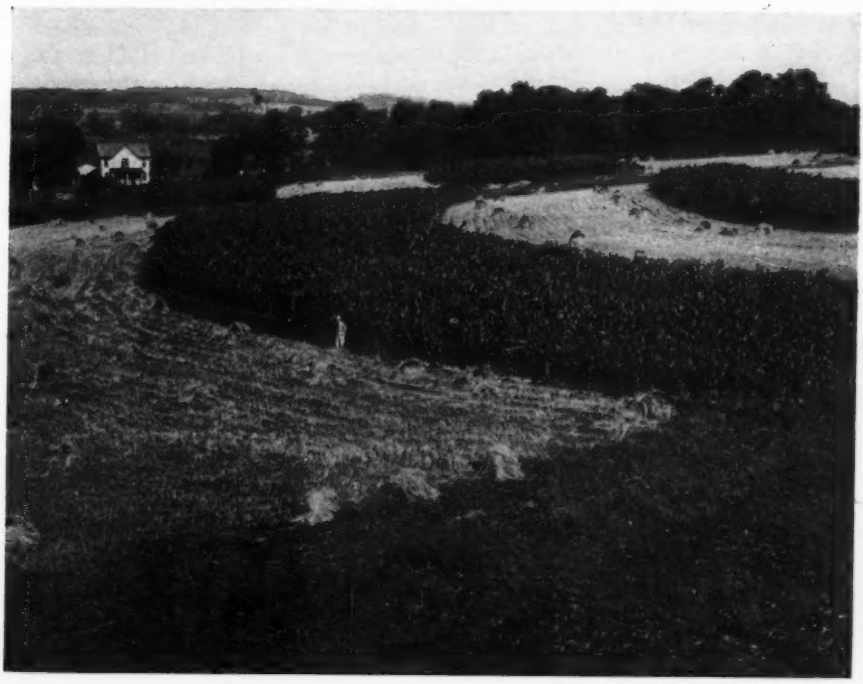
A FUTURE FARMER WITH A FUTURE PORKER

Above: Sod draw and contour strips in a two-year rotation in Minnesota.

Below: A grassed waterway between corn and oats in Illinois.

Above: Terracing and strip-cropping in Minnesota with a three-year rotation.

Below: July view in Ohio. Note exceptional height of corn.



Above: Planning outlet for contour stripping system in Illinois. Waterway will be bladed in and seeded, and sod flume will be constructed.

Below: This 3% slope is being divided into strips for a four-year rotation on land that has lost one-half of its topsoil.

The Editors Talk

Large Scale Soil Testing

A year ago, in the February 1940 issue of BETTER CROPS WITH PLANT FOOD, an editorial entitled "Soil Information on a Mass Basis" briefly described a nation-wide program for testing soils in Germany, as reported by the American Consulate General in Frankfort-on-Main. It was stated that this large undertaking, which would involve the testing of 100,000 soil samples annually at each of the 70 agricultural experiment stations throughout the country, was made possible by the development of simple but accurate testing methods involving the use of photo-electric cells. Another advantage claimed for the methods was that they could be carried out by workers trained in the technique of the tests, but without the necessity that they have a scientific background.

This editorial attracted considerable attention, judging from the number of inquiries received from those who wished to have more details on the methods used. This fact, together with the Institute's own interest in the field of soil testing, prompted a search for articles which would throw more light on the technique than would come within the scope of a consular report. After some investigation, it developed that the methods referred to were the Schuhknecht-Waibel colorimetric flame tests for phosphoric acid and potash. The application of the methods is described in some detail by Schmitt and Breitwieser, of the Darmstadt Agricultural Experiment Station, in the magazine Bodenkunde und Pflanzenernährung, Volume 15, Number 5/6, 1939.

In order that those interested might have additional information on the method, the article has been translated and appears in the section on Foreign and International Agriculture in this issue of BETTER CROPS WITH PLANT FOOD. In making the translation, the introductory part of the article has been condensed somewhat, but the details of the methods and description of the apparatus have been included in full. The original article includes three illustrations of the apparatus, which we have not been able to reproduce here. The Carl Zeiss Company in New York states that it can supply the apparatus.

It will be seen from the article that the soil testing really is an adaptation of the Neubauer rye seedling method, well known in this country for many years. The new testing methods referred to in reports apply to the analysis of the ash of the seedlings, whereby the potash is determined by the flame test, measured by means of a photo-electric cell, and the phosphoric acid is determined by measuring the intensity of color developed by standard reagents and measured by the same photo-electric cell.

Because of the large number of analyses a worker can complete in a day, the authors call this a rapid method for testing soils. Their conception as to what constitutes a rapid method differs somewhat from that usually held in North America. Here it is commonly considered that a rapid test should be completed within a few minutes, or at the most, a few hours, with a minimum of apparatus,

and in many cases, in the field. The Neubauer method, even with the recent modifications, requires two weeks' growth of the rye seedlings, following which the plants have to be carefully removed from the soil and sand in which they are grown, ashed, and then the phosphoric acid and potash contents of the ash determined. It is in the latter step that the new methods are introduced, displacing the older, more conventional methods of quantitative analysis.

The Neubauer is recognized as one of the best methods of determining the needs of a soil for phosphoric acid and potash, and the modifications in technique make it even more adapted to making large numbers of tests. Whether these advantages will cause it to displace to a greater or less extent the rapid tests developed in North America remains to be seen.

Back to Work on New Ideas

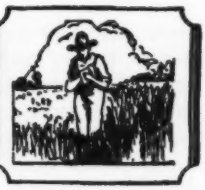
Southern agriculture has met, frankly aired its troubles, taken stock of the progress made in 1940, and gone back to work on countless ideas for a better South. Like the individual farmer early in the year programming his season's work, the Southern Agricultural Workers meet in early February to consider ways of best serving in their specialized capacities the rural section of our Nation which is suffering most from loss of our export trade, soil erosion, and resultingly lower standards of living. This year's was the 42nd annual convention of the Association, and it was held in Atlanta, Feb. 5-7. Attendance totaled more than 1,200. As previously, the convention was all-inclusive, covering fields of agricultural engineering, economics and rural sociology, information, soils and crops, animal husbandry, dairy science, forestry, home economics, horticulture, marketing, poultry, phytopathology, plant physiology, soil conservation, et al.

Highlighting general sessions and a great many of the group sessions were discussions on ways and means of obtaining better nutrition for the lower income groups. This important plank in our National Defense Program was not a new subject to the South, which for some years has been encouraging diversification of agriculture and a "live-at-home" program. Much progress along this line has been made, with great credit due the untiring efforts of Southern extension forces to wean a rural populace away from long-standing habits of thinking and acting only in terms of the "cash" crop.

The soil, foundation for all nutrition, was the key topic for many of the conferences. To more accurately determine its efficient fertilization, the use of rapid chemical tests was given considerable attention, many of the lines of research presented growing out of papers given at the convention last year. The use of plant-tissue tests was a new development. It was brought out that in many cases soil tests did not give entirely satisfactory results and that the use of plant-tissue tests offered the possibility of getting a better picture of the soil's fertility. In most cases it was felt that the two tests complemented each other, the soil test providing a practical chemical method of determining fertility prior to planting; the plant-tissue test, while the crop is growing. This then affords opportunity to correct unbalanced fertility by the use of top-dressers or by proper fertilization of the following crop.

Great interest was shown in these testing methods, and it was evident that much work on correlating these tests to local conditions needs to be done. That it will be done and that fertilizer practices in the South will be steadily improved are guaranteed by the earnestness and ability of Southern Agricultural Workers.

REVIEWS



This section contains a short review of some of the most practical and important bulletins, and lists all recent publications of the United States Department of Agriculture, the State Experiment Stations, and Canada, relating to Fertilizers, Soils, Crops, and Economics. A file of this department of BETTER CROPS WITH PLANT FOOD would provide a complete index covering all publications from these sources on the particular subjects named.

Fertilizers

¶ Professor C. J. Chapman, of the Soils Department, University of Wisconsin, gives his annual summary of the large number of fertilizer demonstrations conducted with small grains and seedings of clover and alfalfa in the unnumbered mimeographed report titled "What Fertilizers for Small Grains and Seedings of Clover and Alfalfa." Farmers of this State undoubtedly obtain much of value from the instructive information contained in these reports, since the data show how the proper application of commercial fertilizer not only produces larger yields of grain and bigger crops of alfalfa and clover, but also gradually builds up the fertility of the farm as a whole.

Based on the results of more than 500 demonstrations in 1940 and hundreds of similar comparisons in former years, the Wisconsin authorities are recommending more and more potash for grain and legume seedings, even on the heavier soils of the State. For silt and clay loam soils in average fertility, an 0-20-10 at rates up to 200 pounds per acre is recommended where applied with a grain drill, or 250 pounds where applied broadcast. For the sandier soils where seedings of clover or alfalfa are being made, the officials recommend up to 300 pounds of 0-20-20 per acre. For small grains on the bottom muck or peat soils, 0-9-27 at the rate of 200 to 250 pounds per acre is advised. Some of the thinner light colored silt and clay loams where nitrogen is needed in the mixture should receive such analyses as 3-18-9 and 3-12-12. Certain soils may contain an abundance of plant-food nutrients and yet require no fertilizer, while others may need only phosphate. Farmers are urged to have their soils tested from time to time in order to determine the fertilizer that should be selected.

Professor Chapman says, "The future prosperity of Wisconsin dairy farmers will be measured by the extent to which they carry out a soil-building program. Our soils are wearing out—let's repair them."

"Production and Agricultural Use of Ammonium Sulfate," U. S. D. A., Washington, D. C., Cir. 578, Nov. 1940, C. C. Fletcher, Albert R. Merz, and B. E. Brown.

Soils

¶ A very interesting description of how Michigan's soils were developed during the different glacial stages, dating from about 10,000 to 30,000 years ago for the two or more ice sheets or glaciers known to occur, is ably presented by Dr. C. E. Millar, in Michigan Experiment Station Circular Bulletin 176, "Soils of Michigan." The circular briefly tells how the moraines, outwash plains, and lake-bed plains were formed; describes the soil formation—mineral or upland soils and organic soils; and gives some idea of the quality, or productiveness of the soils based on a State-wide classification of the land.

The author denotes the cardinal points in good soil management so that soil fertility may be maintained. These are: (1) adding lime to acid soils; (2) using a cropping system by which every cultivated field grows alfalfa, clover, or a mixture of grass and alfalfa every four years, or a crop of

sweet clover turned under; (3) the careful saving and application to the land of all animal manures; (4) the control of erosion through rearrangement of fields, cropping system, and tillage practices; (5) using winter cover crops to prevent loss of plant food through leaching and erosion; (6) the use of commercial fertilizer to supplement the plant-food supply in the soil and manure.

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Crops

¶ "Farmers in a Changing World" is the title of the 1940 Yearbook of Agriculture, U. S. Department of Agriculture. Most of the 54 articles in the book record explorations along the social and economic frontiers of agriculture, and were prepared by workers in the Department whose job it is to conduct research in agricultural problems and carry out laws relating to agriculture passed by Congress. A few contributions were by writers who are not in the Department—mostly specialists in various branches of social science.

"The book is divided into seven parts. Part 1, The Farmer's Changing World, is a history of agriculture in the United States from the colonial period through 1939, with special emphasis on changing needs and conditions that have shaped national policies during these centuries. Part 2, Agriculture and the National Welfare, deals with relationships between producers and consumers, agriculture and industry, farm people and city people. Part 3, The Farmer's Problems Today and the Efforts to Solve Them, is a comprehensive survey of current agricultural problems and current efforts to solve them. These problems fall into several different groups—soil conservation and land use; farm management; foreign and domestic markets; credit, insurance, and taxation; rural standards of living; tenancy and labor. Part 4, Farm Organizations, reports the viewpoints and recommendations of three national organizations of farmers in the United States—viewpoints that are sometimes opposed to, sometimes in favor of, specific policies. In Part 5, What Some Social Scientists Have to Say, a few representatives of different social sciences view agriculture as a whole from their particular angles. Part 6, Democracy and Agricultural Policy, deals with the relationship of policy making to democratic processes. Part 7, Essentials of Agricultural Policy, is an attempt to sum up what has gone before in terms of today's and tomorrow's policies."

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"Winter Clover Pastures for Peninsular Florida," Agr. Exp. Sta., Gainesville, Fla., Bul. 351, Nov. 1940, R. E. Blaser and F. T. Boyd.

"Cotton Variety Experiments at Seven Locations in Georgia, 1937-1940," Agr. Exp. Sta., Experiment, Ga., Cir. 124, Dec. 1940, R. P. Bledsoe and U. R. Gore.

"Lespedeza and Its Uses," Agr. Ext. Serv., Athens, Ga., Cir. 283, Mar. 1940, E. D. Alexander.

"Austrian Winter Peas and the Vetches for Fertilizer, Feed, and Soil Protection," Agr. Ext. Serv., Athens, Ga., Cir. 284, Aug. 1940, E. D. Alexander.

"Commercial Vegetable Recommendations," Agr. Ext. Serv., Athens, Ga., Elmo Ragsdale.

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"Making Better Use of Legumes and Grasses," Agr. Ext. Serv., Urbana, Ill., Aug. 1940, E. T. Robbins, E. D. Walker, and W. B. Nevens.

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"Farm Woodlot Management in Kansas," Agr. Exp. Sta., Manhattan, Kans., Cir. 201, Oct. 1940, Lloyd F. Smith.

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Economics

¶ For the first time the Connecticut Agricultural Experiment Station has included data relative to the tonnage of different grades of fertilizer sold in the "Commercial Fertilizers Report for 1940," Bulletin 441, by E. M. Bailey. Publication of information on fertilizer tonnage sold in the State is the result of a conference between representatives of the fertilizer industry operating in Connecticut and fertilizer control officials, at which it was agreed that such information should be published by the State. Tonnage included in the Bulletin includes only fertilizers which are subject to provisions of the Law of the State and does not include fertilizer materials distributed under the Government's Agricultural Conservation Program.

During the 1939-40 fertilizer year

16,471 tons of materials containing chiefly nitrogen were sold. These consisted largely of cottonseed meal, castor pomace, soybean oil meal, and nitrate of soda. The sale of materials containing chiefly phosphoric acid amounted to 5,941 tons and consisted mostly of superphosphate. There were 2,713 tons of potash materials sold, of which 1,894 tons were cottonhull ashes and 819 tons muriate and sulphate of potash. The 2,624 tons of organic materials containing nitrogen and phosphoric acid which were sold were made up mostly of ground bone and dry ground fish. Mixed fertilizer sales amounted to 32,463 tons, of which 29,648 tons were commercial mixtures and 2,815 tons were special mixtures. The most important grade from the tonnage viewpoint was 5-8-7. Other important grades in the order of the tonnage sold were 6-3-6, 4-8-4, 8-16-16, 5-3-5, 7-7-7, 4-8-10, and 5-10-10. The combined total of these grades represented 66.5% of the total of mixed fertilizers used.

¶ Fertilizer sales in Massachusetts in 1939-40 amounted to 64,998 tons, which was slightly higher than in the previous season, but about 4,000 tons less than in the period ending July 1, 1938, according to Bulletin 105 of the Massachusetts Agricultural Experiment Station, "Inspection of Commercial Fertilizers," by P. H. Smith and J. W. Kuzmeski. The totals do not include the superphosphate distributed by the A.A.A. Plant-food tonnage in 1940 amounted to 3,526 tons of nitrogen, 5,541 tons of phosphoric acid, and 3,967 tons of potash as compared to 3,488 tons of nitrogen, 5,531 tons of phosphoric acid, and 3,871 tons of potash in the previous season. Of the total tonnage 43,736 tons were in the form of mixed fertilizers, 19,673 tons represented chemicals and materials unmixed, and 1,589 tons pulverized natural manures. Leading mixtures in order of their tonnage were 5-8-7, 4-8-4, 6-3-6, 4-8-7, 4-8-10, 7-7-7, 8-16-16, 5-8-10, 5-10-10, and 7-6-6. The 10 leading grades represented 70.5% of the total of mixed fertilizers sold.

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"South Brazil—New Land of Cotton," U. S. D. A., Washington, D. C., Cir. C-117, May 1940, Omer W. Herrmann.

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"Production, Farm Disposition and Value of Beans, 1909-37," U. S. D. A., Washington, D. C., Sept. 1940.

"Working Plans for Permanent Farms," U. S. D. A., Washington, D. C., Misc. Pub. 411, Oct. 1940, Glenn K. Rule.

Foreign and International Agriculture

To supply information on agricultural research and practice in other countries, brief abstracts of articles in foreign publications are given here. Due to space limitations, only articles of general fundamental interest are included, although the publications may contain other articles and reviews.

Bodenkunde und Pflanzenernährung, Vol. 15, No. 5-6, 1939

THE APPLICABILITY OF THE SCHUHKNECHT-WAIBEL APPARATUS FOR DETERMINING POTASSIUM AND PHOSPHORIC ACID TO THE FLAME PHOTOMETRIC AND COLORIMETRIC DETERMINATION OF POTASSIUM AND PHOSPHORIC ACID IN SOIL EXTRACTS AND PLANT ASH. *By L. Schmitt and W. Breitwieser, Agricultural Experiment Station, Darmstadt, Germany.*

Extensive investigations by the authors with the use of various apparati for determining the potassium in plant ash showed that a flame photometric determination could be carried out with satisfactory accuracy and great rapidity. Apparatus prepared by the Zeiss company permitted the determination of potassium in ash of plants obtained by the Neubauer rye seedling method so accurately that 42% of the determinations agreed exactly with determinations made by the perchloric acid method, 82% varied no more than 1 mg., 98% varied no more than 2 mg., and 100% fell within 3 mg. of the perchloric acid method results.

The Neubauer method long has been considered the most satisfactory means of extracting the available phosphoric acid and potash from the soil, but the time-consuming and tedious potassium determination of the ash of the plants has acted as a deterrent to its more widespread use. With the development of a method of determining phosphoric acid and potassium in the ash of the rye seedlings, whereby several hundred determinations can be made by an investigator in a day, the authors believe that the Neubauer method can now be classed as a rapid method for the determination of available nutrients in a soil.

The original apparatus was provided with a mirror galvanometer. This required considerable space and has since been replaced by a Siemens and Halske light-beam galvanometer. The latter is somewhat similar in design to a needle galvanometer, but the needle is replaced by a light-beam which is reflected on a scale divided into 100 parts. The light-beam galvanometer has the advantage of ease of installation on any table. While the scale has only 100 divisions, the light-beam is very steady and the readings can be estimated to fifths of a division. Comparative trials with the two types of galvanometer gave satisfactory results with the more easily used light-beam galvanometer.

Details of Method

The rye seedlings are ashed and the silica removed in the usual manner. The residue is taken up with exactly 1 cc 25% HCl and about 10 cc hot water. After solution of the incrustations, all is washed into a 100 cc flask with hot water, and after cooling, filled to the mark. After shaking, the solution is filtered through a potassium-and-phosphoric-acid-free folded filter into a 250 cc Erlenmeyer flask. This is termed solution A.

Determination of Potassium

Compressed air, passed through a glass filter for purification, is brought to 1.5 atmosphere pressure by a reducing valve, and regulated to exactly

.6 atmosphere by a manometer. Acetylene from a tank is passed through a reducing valve, and with a water manometer, brought to 160 mm pressure. The gas enters the burner and is ignited at the nozzle. It is very necessary to hold the pressure absolutely constant during the entire period of the determination. The pressures have to be adjusted to each set of apparatus, according to directions supplied by the manufacturer, the figures given above applying only to the apparatus used in this work, but are mentioned to give a general idea of pressures employed.

The image of the flame, enlarged about threefold by a lens, appears on a white diaphragm screen, which is attached to the photoelectric cell. Behind the diaphragm screen is the red filter which permits only the light of the potassium double line from the potassium spectrum emitted by the flame to pass through. The 80 volt current of the photocell is taken from an anode battery and the photocurrent arising from the light falling on the photoelectric cell is measured by a light-beam galvanometer, illuminated by means of an accumulator.

The positive pole of the galvanometer is connected with the positive pole of the anode battery, the negative pole of which is connected with the negative pole of the photocell, and the positive pole of the photocell is connected with the negative pole of the galvanometer.

The apparatus must be calibrated with solutions of known potassium content. For this purpose, 15.829 g KCl dried in a dessicator over calcium chloride, is dissolved in water to make a liter, this being equivalent to 10 g K_2O per liter. Portions of this solution are diluted to give 15, 20, 25, etc., up to 100 cc per liter, corresponding to the same number of mg K_2O per 100 cc. By regulating the iris diaphragm attached to the photocell, the apparatus is adjusted so that on determination of the standard solution with the highest potassium concentration, the galvanometer light-beam reads 100 on the scale.

The individual solutions are introduced into the atomizer through a glass funnel with a pinchcock. The air laden with the small particles of liquid goes through an intermediate flask to the burner. After reading the galvanometer deflection, the liquid is drawn off through a pinchcock to a jar under the table. The reading on the scale and the K_2O concentration are then plotted to make a calibration curve, or made into a table of standards.

Before running any series of analyses, it is advisable to check the calibration curve with the standard solutions. When shutting off the apparatus, the acetylene should be shut off first, then the compressed air.

The apparatus now prepared by Zeiss is also suitable for analyzing solutions of very low potassium concentration, such as obtained by water or acid extract of soils, which may contain less than 1 mg K_2O in 100 cc of solution. In these cases, the light-beam galvanometer is not satisfactory, and a highly sensitive mirror galvanometer should be used.

Determination of Phosphoric Acid

For the determination of phosphoric acid, the illuminating apparatus, provided with a cell-holder and funnel, is introduced into the path of the light by means of an elevated arm. The acetylene and compressed air parts of the apparatus naturally are not used in this determination. The light of the illuminating lamp goes through the cell to the opening of the white diaphragm screen and thereby to the photoelectric cell. About 10 cc of solution are needed to fill the cell, the filling and emptying of which are done quickly and simply by use of pinchcocks.

Here also a calibration of the apparatus with solutions of known phosphoric acid content must be carried out. A standard solution containing 1.9170 g KH_2PO_4 (according to Sörensen) or 1 g P_2O_5 in a liter is used. Of this, 2 cc are diluted to 500 cc, and 2 cc (=0.2 mg), 3 cc, etc., of the latter

are placed in a 100 cc flask with exactly 1.4 cc molybdate reagent made up according to Zinzadze, with about 80 cc hot water. This is heated on a water bath for one-half hour. After 18 hours, the flask is made up to the mark, shaken, and the solution drawn for the cell.

The solution with the lowest phosphoric acid concentration is run first (the opposite to the course followed with potassium) and the light-beam galvanometer is set by means of the resistance of the illuminating lamp and iris shutter so that the mark of the light stands at 100. By running stronger solutions, and plotting the galvanometer readings against concentration of solution, a calibration curve is obtained.

For determination of the phosphoric acid in the solution of the ash (A), 1 cc is colored in a 100 cc flask as described above. The values obtained, multiplied by 100, give the phosphoric acid content per 100 g soil. Continual checking of the standard curve and of the apparatus with the standard solution is necessary. A blue filter also can be used in the determinations.

Summary

Apparatus prepared by Zeiss and Siemens and Halske for determining potassium and phosphoric acid according to Schuhknecht and Waible was tested by the Agricultural Experiment Station at Darmstadt in a large number of Neubauer ash determinations, with the following results:

1. The new apparatus using a light-beam galvanometer of Siemens and Halske is very well adapted to determination of potassium and phosphoric acid content of the ash of Neubauer rye plants.

2. With the apparatus, several hundred potassium or phosphoric acid determinations a day can be carried out without difficulty.

Further work will be necessary to ascertain whether the apparatus is adapted to the analysis of fertilizers and to the determination of other elements such as sodium, copper, calcium, manganese, and others.

Use Boron and Potash for Better Alfalfa

(*From page* 11)

acre. Judging by this experience, some caution should be observed in the amount of borax to apply at the time of seeding if risk of initial injury is to be avoided. Possibly 10 to 15-pound rates would be entirely safe and ample in most cases for seedling needs.

Somewhat larger rates appear safe and may be needed for older plants beyond the seedling stage. For established stands, a 20 to 30-pound rate seems satisfactory. One method of applying such small amounts is by mixing a grade of finely granulated borax with other fertilizers to be used.

Reference has been made to some results obtained from potash applications for alfalfa. Two instances will be cited.

In one trial, two methods of supplying potash were compared. On some plots, all the potash was mixed in the soil prior to seeding, using 500 and 1,000 pound rates of muriate of potash to the acre. On adjacent plots, potash was applied only as top-dressing, for comparison, using 300-pound rates annually for three seasons following. Treatments with phosphorus also were included. The soil is light in texture, underlain with sandy gravel and is classed as Merrimac. In this trial, alfalfa responded well from both methods of supplying the potash. In fact, on this light soil type, the annual top-dressing treatment appeared to be entirely efficient.

A second trial, on the College farm, showed a marked response from applying potash only as top-dressing. In this case, the layout consisted of 12 seeding

mixtures varying in amounts of alfalfa. The plots were seeded in 1935 in long narrow strips. During the five seasons this trial was in progress, muriate of potash was the only material used for top-dressing and it was applied only on one-half of the area across all the plots. This section received the muriate of potash each spring of the four years the plots were harvested and at the rate of 300 pounds to the acre. A slight difference in the vigor of plants appeared in the first two seasons due to the potash. This difference became more pronounced during the last two seasons of the trial.

Alfalfa plants especially responded to the potash treatment. During the third season, the yield of hay from the potash treatment was increased by 1½ tons to the acre over that of the untreated sections. In the fourth and final season, the yield from the potash side was increased by 2 tons over that of the no-potash side. After four seasons of harvest on these plots, alfalfa plants had practically disappeared and the yield of grass was low on the section where no potash had been supplied. In striking contrast was the vigorous productive stand of alfalfa remaining on the potash side. Not only had it produced a total of 3½ more tons of hay, but also it was in thrifty condition for further production due merely to a difference of 300 pounds of muriate of potash applied annually at a cost of around $6 to the acre.

Florida's Search for Better Grasses

(*From page* 14)

growth. Plants cut only at the end of the season were dry and retained practically no vegetative parts when harvested. It is now a well-known fact that pasture grasses of practically all kinds should be kept grazed or mowed to keep them succulent.

Because it is subject to cold damage, Bahia has been used as a pasture plant only in Florida. However, new strains show promise of cold resistance combined with palatability and bid fair to spread to other portions of the South. A strain from Paraguay has been tested at Florida for three years and is being pastured this year. G. E. Ritchey, associate agronomist with the Florida Station and the U. S. Department of Agriculture, is highly encouraged by the results secured. The same strain is being grown in 1940 at experiment stations throughout the South.

Bermuda and carpet, two long-time favorite pasture grasses in the South, are still used widely for permanent and improved pasture plantings in Florida. Since Bermuda spreads by underground runners and is difficult to eradicate from cultivated fields, a strain known as St. Lucie grass—without the underground runners—has become popular in some areas. Also giant Bermuda, which grows taller and produces more grazing, is popular along the Florida East Coast and is becoming popular in other States.

Carpet grass, often in combination with common lespedeza, perhaps is still the most widely used grass on moist, fertile soils. A perennial, it is easily seeded during almost any month of the year in Florida, and tens of thousands of acres of Florida land have been seeded to it during the last three years.

Dallis grass, a large perennial, erect, bunch grass, native of South America, stands heavy grazing. It seems best suited to non-acid muck lands, heavy clay soils of a moist nature, and flatwoods lands underlaid with clay. It is more winter hardy than any of the other pasture grasses in use at present and gives some winter grazing. This grass produces seed, but domestic seed usually are affected with a fungus which injures their germination, making imported seed desirable for planting purposes.

Another South American immigrant, Para, introduced into Florida many years ago is among the best available for plantings on fertile lowlands of southern Florida. It supplies some grazing most of the year, and during eight or nine months will carry two or three cows or other animals to the acre. In the Everglades country it is found along the spoilbanks of drainage canals and roadsides. It is propagated by rooted runners or cane cuttings scattered over the land.

Other New Grasses

Another grass which resembles Para, and is propagated in a similar manner, is carib. This was brought to the Florida Station in 1914 from Brazil. It is injured by frost at Gainesville, but thrives farther south in Florida. It has shown up exceptionally well under pasture conditions at the Everglades Experiment Station, Belle Glade.

Cogon grass and *Panicum repens*, both of which may prove to be severe pests if introduced into cultivated areas, have proven a combination apparently very promising for cut-over sandhill lands in tests at the Brooksville Station, operated by the U. S. Department of Agriculture with State cooperation. They develop a very heavy root system, grow rapidly, make a tremendous amount of herbage, and the Cogon grass seems especially well adapted to the light, sandy soil. It furnishes grazing early in the spring and somewhat later in the fall, giving a longer grazing season. It is prone to get tough unless closely grazed, and mowing the pasture is desirable when the Cogon grass gets tall.

This grass has attracted more attention at Brooksville than any other one tested, but it is not yet generally recommended because of its potential pestilential ability. No seeds are available, and vegetative plantings are necessary.

Some strains of wooly-finger grass from South Africa have shown up exceptionally well at both Gainesville and Brooksville, particularly the species *Digitaria marginata*. It seems to require fertile soils.

Another grass tested at the Experiment Station and on Florida ranges is Vasey. In Highlands County it was least affected by the cold weather of 1939-40, and has interested cattlemen for that reason. Mr. Stokes says it is not as good as Dallis, but may be better than Dallis for certain soils and climatic conditions.

Centipede grass from China has been under observation at the Florida Station for the past 22 years, and the grass has made a good showing in pastures in Florida. However, at Tifton, Georgia, it has not been nutritious, and Federal scientists are cooperating with Georgia and Florida workers in an effort to determine the reason for the variation.

No seed of centipedes are available, and vegetative plantings are necessary. It grows close to the ground. For these reasons it is not considered a top rank pasture grass. However, it has proven one of the best lawn grasses for light sandy soils of the Southeast, and it is widely used for this purpose.

Thousands of strains of various kinds of pasture grasses have been and are being tested, and many new ones are showing promise. Florida Station agronomists are recommending principally carpet, Bahia, Bermuda, Dallis, Para, and Napier for pasture and forage.

Pasture Requirements

Tests and experience have shown that moist, fertile soils and desirable grasses can be made to produce good grazing and cheap feed. Permanent pasture grasses can be seeded or started with vegetative plantings almost any month of the year in Florida. The principal requirement is moisture, and consequently the summer rainy season, June to August, is a desirable time to establish a pasture.

On range lands the undergrowth of saw palmetto, gallberry, and other bushes and wiregrass must be eliminated before the improved grasses are planted. Cattlemen are using heavy disk harrows and rotary cutters to eliminate undergrowth on thousands of acres of land.

Dr. Leukel has found that wiregrass can be retarded for more than a year by burning just before the advent of the rainy season in late April, May, and early June. Carpet grass seeds can be sown on the land at the beginning of the rainy season, and the young grass will get a good start before wiregrass can crowd it out.

Well-prepared, firm seedbeds and ample moisture are the other principal requisites for beginning a pasture planting. Mowing from two to three times a year to eliminate weeds and grasses which are becoming tough pays excellent dividends.

Fertilization of Grasses

Considerable work on the fertilization of grasses has been done by experiment stations throughout the country, and this type of research is being rapidly expanded to the point where a vast amount of definite information on the subject will be available in a very few years. The Florida Station inaugurated its fertilizer studies with grass in 1925 and enlarged them in 1937.

In common with the work conducted elsewhere, its research has shown that nitrogen is the principal element needed and gives the greatest increase in early growth and total growth as well as in succulence. However, lime, phosphate, and potash stimulate further growth and favorably influence the composition of the grass, producing more nutritious feed. Cattle prefer the fertilized grasses every time.

Dr. Leukel reported that grasses treated with a balanced fertilizer produced 1.4 times as much green weight as those with low potassium, and 2.5 times as much as plants treated with low phosphorus. Plants with a balanced fertilizer produced approximately twice the dry weight of top growth as did plants with low potassium or phosphorus. The elaboration of carbohydrates showed marked retardation, being about half as much in the low phosphorus and low potassium plants as in plants receiving a balanced fertilizer. Such retardation eventually results in abnormal growth and lower plant production.

Roy Blaser of the Florida agronomy staff reports dry weight yields of grasses almost doubled as a result of being properly fertilized for three years. He gives the following table of dry weight yields per acre of grasses grown on three flatwoods types of soil—Leon, Plummer, and Bladen.

Fertilizer Applied per Acre					Dry Yield per Acre (cwt.)	
Ground Lime	18% Superphosphate	Muriate of Potash	Nitrogen in March	Nitrogen in August	1939	1937–39 Average
0	0	0	0	0	16.1	14.9
0	0	0	200	200	25.3	26.6
0	0	50	200	200	29.4	26.4
0	400	100	200	200	29.2	27.4
0	400	0	200	200	29.9	27.2
1,000	400	100	200	200	31.4	27.5
	800	100	0	0	20.4	17.7
2,000	...	100	200	200	25.2	24.5
2,000	400	0	200	200	31.3	27.8

The nitrogen applied consisted of half nitrate of soda and the other half sulphate of ammonia. The lime, phosphate, and potash were applied in

March 1937, the nitrogen in March and August each year.

It is seen from the figures in this table that light applications—400 pounds of superphosphate and 100 pounds of muriate of potash, together with 200 pounds of nitrogen each March and August—prove most profitable.

Mr. Blaser, assisted by Dr. Leukel, has carried the research even further and determined the effect of fertilization on composition of carpet grass. They supply the following figures on green yields and composition of carpet grass on a Bladen soil, the yield weights taken April 17, 1940—early in the season.

Lime	Pounds Fertilizer per Acre			Green Yield	% K	% P	% Ca	% Mg	% N
	18% Superphosphate	Muriate of Potash	Nitrate of Soda						
0	0	0	0	63	.670	.132	.349	.161	1.89
0	0	0	200	502	.563	.100	.293	.193	1.89
0	800	100	0	84	....	....	....	....	....
2,000	800	200	200	1526	.430	.170	.544	.257	1.91
500*	200*	50*	200	2289	.794	.234	.572	.181	1.91
2,000	400	0	200	1161	.401	.170	.395	.210	1.91
2,000	0	200	200	961	.874	.106	.254	.153	1.91

* Applied every year; all other lime phosphate and potash applied in 1937; nitrogen applied every year.

It is evident that fertilization can double the calcium, phosphorus, and potassium content of carpet grass on Bladen soils in Florida. Bladen is typical of many flatwoods soils commonly found in the State. It is also evident from these figures that frequent light applications are more satisfactory than infrequent heavy applications of fertilizers.

In some of the studies where applications of nitrate have returned almost as good yields as followed complete fertilizers for the past three years, Blaser and Leukel are now finding evidence of potassium and phosphorus deficiency. In forcing the grass into higher yields the nitrogen has caused the plants to be short on these two essential elements. Blaser says 1940 yields following nitrogen alone will be lower than in previous years. The agronomists believe that phosphorus and potassium deficiencies are common throughout a good portion of Florida. They have noted evidence both in 1939 and 1940 which lends credence to the belief.

Florida Can Grow Clover

One of the most important pasture findings for Florida is that clovers can be grown in this State, and that clovers may be grown satisfactorily in conjunction with perennial summer grasses, providing grazing when badly needed in winter. The legumes serve also to improve mineral, protein, and vitamin content of livestock feed and increase soil fertility, thus being doubly desirable.

It was formerly thought that clovers could not be grown in Florida, but B. H. Carlton, a Jacksonville dairyman, kept playing with them for nearly a decade, and finally succeeded in growing some excellent clover. He had done so many things, however, that he didn't know just what was the secret of his success. The Experiment Station inaugurated some studies which soon revealed that moist lands, fertilized with a ton of lime, 600 pounds of superphosphate, and 100 pounds of muriate of potash per acre, planted at the proper

time to adapted varieties of clover, with the seed properly inoculated, meant success. The legumes are being grown on thousands of acres this winter.

Varieties found best adapted to Florida conditions have been White Dutch, California Bur, Black Medic, Little Hop, and Persian.

The knowledge about grasses is being greatly enhanced throughout the country, and Florida research workers are contributing their share. Better grasses and fertilization practices are providing greater quantities of more nutritious feeds and at the same time helping to prevent soil erosion and to solve the problem of overproduction of field crops.

Letting Down Barriers to Selling Good Crops

(*From page* 18)

an exception is made for Massachusetts-grown onions. Not long ago most of the dealers in the Northern Ohio Food Terminal, the centralized produce market of Cleveland, pledged themselves not to receive motortruck shipments of fruits and vegetables originating outside of the State.

Investigators say the only group that is likely to gain permanently from limiting the farmers' market to growers or to home produce are the established middlemen and that in many cases even this group is harmed, for such regulations usually limit the size of the market and drive away business. In general, the larger and freer the market the more buyers are attracted to it. Marketplace barriers against distant produce often mean that the truckers sell it on the streets or peddle it from store to store, leading to unstable conditions. In the height of the local season, distant producers cannot compete with the local growers anyway, and at this time the local farmers are likely to have a surplus they want to send to other markets—and then these local growers want to be restricted as little as possible.

Time to Change

Better than non-enforcement of troublesome barrier legislation is the effort to prevent barriers and even to reduce them. Since many States and markets have been given to protective and retaliatory action in this contest of barrier building, a campaign of correction must have wide scope and wide backing.

These are now assured. Governors of several States have called these barriers and many others to the attention of the citizens, and State agricultural officials have protested against them. Members of the National Association of Commissioners, Secretaries, and Directors of Agriculture have pledged themselves to resist future efforts to discriminate against farm products from other States. This Association also sponsored an investigation a year or two ago by the U. S. Department of Agriculture.

In issuing the report in 1939, based on this investigation, the Secretary of Agriculture stated that the situation was becoming of critical importance to every economic group in the country. He pointed out that some of the regulations are really a potential threat to the very industries they aim to protect and some have unexpected and dangerous consequences. Reprisals, retaliatory measures, and generally unwholesome attitudes between groups in different States and between States too frequently result.

The Council of State Governments resolved in General Assembly that "interstate trade barriers, under whatever guise, are detrimental to the economic welfare of the country." The Council called a National Conference on Interstate Trade Barriers. It pointed to scores of barrier bills pending in

the State legislatures and declared that if this movement were not halted it would undermine a basic principle of the Constitution of the United States—a principle upon which our well-being largely depends.

Action Under Way

Action speedily got under way. A Federal-State campaign was outlined and set going. In an address before the Conference of Western Governmental Problems, the Secretary of Agriculture stated the goal to be a freedom of trade that will allow each market to admit any healthful and honestly described product from any part of the country. He urged a uniformity among protective regulations that would facilitate safe and satisfactory interstate shipment. He outlined several possible approaches to this goal, the third of which he thought the most hopeful. It calls for joint action by State and Federal Governments, each working within its own sphere but supplementing and reinforcing each other.

At this time the Secretary announced that a committee in the Department of Agriculture had already begun to consider and propose specific partial solutions. During 1939 several regional conferences of State officials were held under the sponsorship of the Council of State Governments, where ways and means of removing specific types of barriers were discussed. In addition, many of the individual State units of the Council, called Commissions on Interstate Cooperation, worked with the units of neighboring States in finding solutions to specific hindrances to trade between their own States.

About a year ago an Interdepartmental Committee on Internal Trade Barriers was formed with representatives of the Departments of State, Treasury, Commerce, Labor, Justice, and the Federal Works Agency, as well as the Department of Agriculture. The wide sweep of the fields affected by these barriers is indicated by this list. This committee is to serve as a clearing house for information on developments, to see what Federal agencies can do to improve conditions, and to act as a point of contact between the Federal Government and the Conference of State Governments.

A little later the Temporary National Economic Committee held hearings on the subject. Some of those appearing compared the threat of these barriers to the economic chaos found among the little tariff-walled Balkan States. These hearings dramatized the situation before the newspaper-reading public.

Results Noted

Results to date have been chiefly preventive. A check-up at the close of the State legislative sessions of 1939 showed that barrier bills had been rejected or withdrawn in more than a dozen State legislatures. Most of these bills related to oleomargarine and to merchant truckers. Almost no retaliatory laws were passed. State officials said these rejections and withdrawals were largely due to the Federal-State campaign.

Actions to remedy existing conditions are next on the program of the campaign. Eyes are now on this winter's legislative sessions. It will be more difficult to correct than to prevent, of course, but as groups are everywhere awakening to the situation, they can be counted upon to support these determined efforts to restore the free movement of farm products.

Johnny: "I fell in a mud puddle."

Mother: "What, with your new pants on?"

Johnny: "Yes. I fell so fast I didn't have a chance to take them off."

"Zoup, sir?" asked the waiter.

"I don't know what you're talking about," said the diner.

"You know what hash is? Well, zoup is looser."

Some Requirements of Fiber Flax

(*From page* 16)

phosphate with potassium and nitrate in the fertilizer has increased yields in three out of four cases on soil that has been cropped for 35 years. The average gain in fiber flax yield has been .14 ton from potassium; .27 ton with potassium and nitrate; and .33 with nitrogen, phosphate, and potassium included in the fertilizer.

Irrigation Proved Profitable

Irrigation has increased the length of fiber flax some six inches. Supplemental irrigation as reported elsewhere by Tomsheck (1936) aids activity of beneficial micro-organisms of the soil and promotes the liberation of nutrients for plants. Irrigation has given a nine-year average increase in yield of .83 ton an acre, an average computed gain in net profit of some $14.62. Irrigation may be helpful in retarding ripening, so that pulling may be completed before the plants are dead ripe. This should aid in securing a high quality of fiber. It may leave soil softer, so flax will be easier pulled. Tall flax is not only of a more valuable grade but is more readily harvested, either by hand or with machinery. With irrigation and fertilizer the total yield has been increased as much as 1.18 tons an acre.

Flax to be given a surface irrigation should be corrugated immediately after planting. Fiber flax should be irrigated early. Recent studies by Jerald Newcomb made as a graduate student show that maintaining the soil moisture supply at above 50 per cent of the useful soil moisture range favors increase in length and yield of fiber flax. Providing an ample supply of moisture and nutrient should prevent rapid ripening, so that pulling may be completed before the flax is dead ripe and a high quality of fiber secured.

The six-year average fiber yield on Willamette silt loam in the irrigation field at the Oregon Agricultural Experiment Station was determined from these plats by Dr. B. B. Robinson and E. G. Nelson. The yield and quality of fiber appear to have been definitely improved both by fertilizer and by irrigation.

Potassium seems to be an especially important nutrient for fiber flax. It appears to give strength, to increase the length of straw, and to render plants more vigorous and disease resistant. This may be due to the action of potassium in keeping lower carbohydrates in solution until they can be translocated to the bast fibers where they are built into tissue. The potassium may aid formation of an enzyme or co-enzyme.

It is suggested that potassium also may be helpful in the formation of beet sugar and potato starch. Full returns may not be realized from potassic salts unless nitrates are also present to accompany potassium ion into the plant. Excess nitrate, according to Robinson (1940), tends to make fiber coarse and weak. A little phosphate may be helpful on old farm land as an aid to root development, and it may increase yield, particularly of seed flax. A low ratio of phosphate in the fertilizer seems desirable for fiber production.

Potash of Prime Importance

The fertilizer requirements of fiber flax may be expected to vary with the soil and its previous cropping and treatments; however, potassium seems to be of first importance among the mineral nutrients needed. Nitrate may be more in demand for early vegetative growth and potassium most needed for fiber formation.

Better growth and yield may be expected when flax is planted very early under western Oregon conditions, and provided with a uniform, moderate moisture content. Since flax responds to a 16-hour day length, as reported by

Redington and Priestley (1925), it is suggested that the value of early planting here is to secure maximum growth during the longest days of the year, and before the field moisture is depleted.

Over half a million acres in Willamette Valley are suitable for fiber flax production.

Potassic salts with nitrogen supplied largely through legume residue may be expected to increase length and value of fiber flax. The potassium may play a catalytic role in synthesis of carbohydrates, or function to keep simpler carbohydrates in solution until they can be deposited in the transforming bast fibers in the flax plant. Microscopic examination of stained cross sections show that potassic salts increase the plumpness of the flax fibers. X-Ray studies show that fertilizers do not change the arrangement of the cellulose units of the fiber.

Supplemental irrigation has increased height and yield of fiber flax, especially when used with fertilizers. One or two irrigations or a total of 6 inches depth appears to be suitable amount on Willamette silty clay loam. Early planting and providing uniform moisture and nutrient supply with the aid of supplemental irrigation in western Oregon tend to delay the maturity and increase the length and value of fiber flax.

Meeting Fertility Needs in Wood Co., Wis.

(*From page* 22)

legumes seeded in the nurse crop in 1941. Amazing results, however, could be seen during the time the grain was maturing as well as after the grain was cut. Farm demonstrators will be anxiously awaiting the coming of spring to determine the value of the fertilizer on the 1941 hay crop on these fertilized fields.

More than 600 farmers attended demonstration meetings on the grain fertilization plots in 1940. Each plot was placarded with complete information so that farmers passing by could understand the test plots. Every effort was put forth to make the plots simple and easy to understand and still demonstrate the value of the application of fertilizer. Fifteen carloads (500 tons) of T.V.A. phosphate have been purchased by Wood County farmers during the year for use on conserving crops such as pastures and meadows. One fertilizer dealer sold 33 carloads of fertilizer in 1940 as compared to 13 carloads in 1939, most of which was applied on Wood County farms.

Fertilizer dealers have been cooperating splendidly with the county agent in an effort to stock the kind and type of fertilizers needed by the farmers and at a price which farmers can afford to pay. In all of these demonstrations, where potash-phosphate mixtures have been used, a greater return was obtained and this is especially true where clover and alfalfa was seeded.

Hope Lies in Plant Food

The hope of Wood County's agriculture lies in replenishing the soil with these important plant foods in such amounts that more efficient production of crops can be obtained. Three thousand Wood County farmers buy annually $500,000 worth of feed. If this amount of money could be spent for fertilizers in 1941 and for many years to come, the soils of the County could be improved, the returns per crop acre would be increased, and the standard of living could be raised. There would be more money for the farmer and his family, a better living and a better education could be obtained, and farmers would leave their fields and farms in a better state of fertility than they found them 50 years ago.

Better Lawns

A Book Review

Warm, balmy days which tantalizingly occur between the blustery days of winter's end make one begin to think about lawns, gardens and golf courses. It is an urge to get out of doors, and back to nature, that seems to come to nearly everyone, regardless of whether he lives in city, suburb, or country. The lawn, since it is the setting in which one lives, naturally tends to receive first and frequently major attention. Very timely, therefore, is Howard B. Sprague's book, "Better Lawns" (McGraw-Hill Book Company, Inc. 1940. $2).

The opening chapter describes the nature of a turf and the general factors affecting it. The next four chapters take up specific factors in some detail. The importance of the soil and such of its characteristics as drainage, texture, organic matter content, and its natural fertility, are first considered. A chapter is devoted to soil acidity, its significance, its bearing on producing and maintaining a good turf, and how to change the acidity, with most attention directed to its reduction through the proper use of liming materials. The following chapter gives practical information on the use of fertilizers for improving the fertility of the soil. The principal nitrogenous, phosphatic, and potash fertilizers are described; the meaning of mixed fertilizers explained; and recommendations on the fertilizing of new and established turfs given. The next chapter shows why organic matter or humus is important.

In order to give background information to permit intelligent handling of seeds and management of turfs, a chapter is included on how grasses grow and develop. This is followed by a chapter describing the most important grasses used for turfs in the areas covered by the book, with illustrations and non-technical methods for identifying the grasses. The good and weak points of each grass and conditions under which it is likely to be the most satisfactory one to use are brought out. The remaining five chapters are devoted to the actual operations of establishing and maintaining a lawn or turf. Time of planting, seed mixtures, preparation of seedbed, rates of fertilization and seeding, spring treatment of turfs, mowing, watering, and control of weeds, diseases, and pests are taken up.

Dr. Sprague has called on his extensive background in practical and investigational work with grasses to prepare a remarkably complete book on lawns. It is written in a style that avoids technical terms, but its completeness will appeal to the specialist as well as to the amateur. Difficult problems are not sidestepped and practical solutions for them are suggested. The section on the control of crab grass alone would justify the book in the minds of many.

A notable feature of the book is the definiteness of the recommendations and directions for making and maintaining lawns. The author has not, however, merely collected a number of rules of thumb which will apply only in the normal cases. He has given reasons for carrying on the several operations necessary for good turfs, and thus the reader is given a background that will stand him in good stead when the unusual cases develop.

While the book is intended to apply primarily in the northern, humid parts of North America, most of the general principles will apply wherever lawns are grown. Those who are responsible for parks, golf courses, and estates and also the householder with a small grass plot will find the book very useful. It is well indexed, thus making it easy to use as a reference or handbook on lawns. It can be recommended as one of the best books written on the subject.

The Cotton Program in Bertie County, N.C.

(*From page* 8)

took this to various communities where a few bushels of seed were treated for each producer who brought seed. Those who had seed treated were requested to plant a few rows of the same variety of untreated seed adjoining the treated seed, with all other conditions the same, so that they might observe the effect of the seed treatment.

During that year we had 14 farmers conduct such demonstrations. Just before chopping the cotton, we made stand counts on treated and adjoining untreated plats. We found an average of 395 plants per 100 ft. of row on the treated plats; but only 249 per 100 ft. of row on the untreated plat. In addition we found 26 dead plants per 100 ft. of row on the untreated plats but only 3 dead plants per 100 ft. of treated row. It was evident that the plants on the treated plats were healthier and more vigorous, and so 100 plants were pulled from each plat to determine the healthiness of the root system. We found an average of 94% healthy plants on the treated plats with 6% showing some disease. On the untreated plats we found only 8% healthy and 92% diseased. Since neither a diseased plant or animal can stand adverse conditions as well as a healthy one, it was evident from these demonstrations that one of the main causes of cotton dying after it has come up in the early season is due to diseased plants.

Cotton plants from treated seed (left) compared with plants from untreated seed (right).

Yields of seed cotton per acre were obtained from these demonstrations, and we found an average yield of 1,420 pounds from treated plats and 1,225 pounds from untreated plats. Based on 4c per pound for seed cotton, a fair price for that season, the seed treatment paid an average of $7.80 per acre. After having the results from these demonstrations in 1936, we felt justified in advocating the treatment of all planting seed and were able to get barrel seed treaters built. These were so distributed that farmers in all parts of the County had access to them.

In 1937 we put out 12 seed treatment demonstrations with the following results: Average number of living plants per 100 ft. of row from treated plats before chopping 518, from untreated plats 208; dead plants per 100 ft. of row from treated plats 16, from untreated plats 35; Percentage of living plants with sore shin on treated plats 15.5%, on untreated plats 74.4%; Plants per 100 ft. of row after chopping on treated plats 167, on untreated plats 92; Average yield of seed cotton on treated plats 1,158 lbs., on untreated plats 959 lbs.; Average value of seed cotton per acre on treated plats $34.74, on untreated plats $28.77.

In 1939 we set up the seed treatment demonstrations on a 3-plat basis, using 3 oz. of 2% Ceresan on one, 1½ oz. of New Improved Ceresan per bushel of seed on another, and a plat with untreated seed. Seven such demonstra-

tions were conducted with the following results: Living plants per 100 ft. of row on 2% Ceresan plats 346, on New Improved Ceresan plats 376, and on the untreated plats 168; Percentage of living plants with sore shin on 2% Ceresan plats 21%, on the New Improved Ceresan plats 7%, and on the untreated 81%; Average yield of seed cotton per acre on 2% Ceresan plats 724 lbs., on the New Improved Ceresan plats 756 lbs., and on the untreated plats 570 lbs. It was no longer a question of the value of seed treatment, and these demonstrations in addition to results from the Experiment Station showed that 1½ oz. per bushel of New Improved Ceresan was just as effective as 3 oz. of 2% Ceresan. Since there is little difference in the cost of the two, it is more economical to use the New Improved Ceresan.

Additional Potash Pays

Seed treatment has been proven to be of unquestionable value, and the majority of Bertie farmers now treat their planting seed. In 1940 a local firm installed an electric seed treater that will treat from 200 to 300 bushels per hour. Based on the average increase in value of cotton from seed treatment, this one operation is worth $57,600 to Bertie farmers per year if they plant their allotted acreage.

For a number of years we had noted many cotton fields badly affected with rust. Consequently in 1934 we began conducting demonstrations in which additional applications of potash were made. After conducting such demonstrations over a period of years, we advised using 400 to 600 pounds 4-8-4 fertilizer per acre before planting and a side application of muriate of potash at the rate of 50 to 100 pounds per acre mixed with 100 pounds nitrate of soda immediately after the cotton is chopped. In some cases this additional potash is applied before planting by using a fertilizer high in potash, but there is some danger of this affecting the stand if it is applied directly under the seed. When satisfactory side-placement fertilizer distributors are made available, this objection probably will be removed.

We find the additional potash controls rust and enables the plants to hold their leaves later in the season, resulting in an increased yield and better developed bolls that are more fluffy, have better fiber, and are easier to pick.

But with all these improvements most Bertie farmers lost money on their cotton crop in 1938 and 1939 on account of boll-weevil damage, and it was evident that the boll-weevil must be controlled or else most of our farmers would be forced out of cotton production. In 1939 a number of farmers tried mopping their cotton with calcium arsenate and black strap molasses dissolved in water. In many cases the growers started too late to get most effective results, but enough did a good job to show that a reasonable cotton crop could be produced even in an unfavorable season if the boll-weevil was controlled. While the average yield of lint cotton per acre in Bertie County was only 164 pounds, farmers who mopped their cotton made from ½ bale to 1¼ bales per acre, with an average of ⅔ bales per acre. Among those who secured such results were Dr. A. Capehart of Roxobel, E. D. Spruill and Frank Harden of Indian Woods, M. E. Evans of Woodard, and Turner Speller, a Negro farmer of Cashie Neck.

Based on these and similar results secured in other counties, an intensive boll-weevil control campaign was put on in 1940. This campaign consisted of community and county meetings, news articles, circular letters, a pamphlet on cotton production to all growers, and field meetings for mopping demonstrations. There was good attendance of interested growers at these field meetings. Supply merchants, ginners, and fertilizer dealers cooperated in this campaign, and they made calcium arsenate and black strap molasses available to all growers. It was a rare thing to find a grower who was not mopping

his cotton, and while most of these who mopped in 1939 did not start in time, most all of them made an early start in 1940.

By following these approved practices and with a cold winter and a dry July, Bertie County farmers in 1940 made the best yield of cotton per acre they have ever made. Reports of 1½ bales per acre were common, and quite a few made close to 2 bales per acre. John Eley Thompson, a 4-H club boy of Colerain, produced 2 bales per acre by following this plan. Other 4-H club boys did not want cotton as a project, but his record proves that cotton is a good 4-H project. Even though cotton is not high in price, both farmers and business men are feeling the effects of a good crop.

We think one-variety-cotton community organizations, whereby the bulk of the cotton from a community is of one variety with a uniform staple, offer the means for cotton farmers to get the most from their cotton crop. Through the use of special gin days for saving seed stocks and a definite program for securing and multiplying new seed, the quality of the cotton may be maintained at a minimum expense. A further advantage is provided for such organized communities through the Smith-Doxey Cotton Act in that they may have their cotton classed for grade and staple without charge by a licensed federal grader.

Through the cooperation of J. A. Shanklin, Extension Cotton Specialist of State College, four one-variety-cotton communities were organized in 1940 in Bertie County, and this year we expect to have such organizations for all gin communities.

Grade and staple reports show that the 1940 cotton crop had the best staple we have ever produced but it was low in grade. This indicates that more attention should be given to picking or ginning the cotton, since the season was ideal for harvesting the crop.

Valentines

(*From page* 5)

and "Snooty"; nothing like that at all. But from that very Valentine pronouncement of forty years ago I have left the bolder, fiercer spirits whenever time was ripe to engage in tributes and admiration for the fairer sex. And strange to say I have found myself in rough company sometimes too, fellows who used to disdain the girls worse than I did back when these men were boys and the world was young. And to those cloistered and sequestered gentlemen among our number who never yielded to the "wimmen folks," I hold a deeper sympathy for them than they entertain for me.

Of course on those Valentine distribution days long gone by there were a number of kids who got few of them and one or two of our number who got none. The dearth of such flattering tokens did not always signify that the particular loser was unworthy of the mark—as a rule it was due to a retiring disposition on his part and to forgetfulness on the part of his daily associates. This human trait somehow persists even beyond the Valentine era of our lives.

IT STRIKES me as I think through this ancient custom of sending Valentines that as one grows mature and stodgy, the bud-bursting theme of undying love and troth-plighting naturally loses out, which makes most of us stop sending them. And as we cannot stoop to coarse invective, comic Valentines are not sent either.

Now Christmas is a time of sending good cheer to mankind in general, more or less with a religious fervor and significance. But on Valentine day one might sensibly start a program of send-

ing tokens of esteem and warm regard for personal favors or deeds of public achievement worthy of praise and encouragement. Naturally you don't think of "loving" another man or "dear sweethearting" a steadfast and progressive woman whose neighborly deeds are kind and helpful, but they might enjoy a pat on the back. Moreover, there are scores of public servants who get no hike in payrolls during the present commercial boom and hardly a comforting word from their patrons and constituents either. One could steal a leaf from our school-day Valentines and begin a campaign to put some of these kind thoughts about others on paper for them to see, on the theory that they appreciate regard while living more than roses and hymns afterwards.

It would do you good some early February eve to take an interval from your bloody newspaper headlines to skim through a few favorite poets to collect suitable bits of rhyme and real poetry to grace your outbound tokens of esteem. For the rough and ready farmers and their kindred scan ye pages of Burns, Riley, Crabbe and Whittier, Frost, and Carlton. For the more critical, fall back on Bill Shakespeare or maybe Browning and Milton. In a pinch you could fix up a sentiment yourself, flavored with the ready wit and mercantile philosophy of the Rotarian brotherhood. The best part is that the recipients would be taken completely by surprise, or else imagine you were mixed up in your holidays. Doubt not that they would reject them.

IT IS to the people who hold jobs and perform manifold services which ordinarily appear to be taken and accepted in a perfunctory way that I would mail these missives of remembrance. Those who do things that we take for granted as bought and paid for with tax money or tithes or donations are the ones who would either feel ashamed or be girded into new and honest endeavor by your Valentines.

Outwardly you or I would not always know whether they would be ashamed because of work ill done or half done, or proud of doing all they could have done under the present circumstances. That would be their own business, not ours. Every man has his moments of strength when he performs great successes, just as he has his moments of weakness when his tasks never go right and he hazards making enemies by his blunders. But if we had any part in electing him or choosing him, or if we could be regarded in the smallest degree to be beholden to him directly or indirectly, maybe a word of encouragement might set him right.

YOUR county supervisors, your alderman, yes, even your assessors, would appreciate a thought or two of cheer. The policeman on the beat, the county agent hustling hither and yon with his motion picture apparatus and his soil charts, the agricultural teacher busy with the project boys afield, the conservation committeemen poring over maps and allotments, the principal who endures somebody else's lack of home discipline with the children, and many similar characters we meet so often and take for granted. If you want to include the butcher and the grocer, you have my permission, always depending on your standing on the credit ledger. I have donated this idea free gratis, expecting few to find time for it—if indeed they even find time to follow me thus far in my rambles. And I shall not be averse to receiving a few from constant readers either, thereby reaping my just reward.

If this movement won't do a lot to help revive and nurture the democratic spirit, then I don't deserve to claim the name of "Jefferson." And if sending such goodly Valentines won't keep your mind off the war, then I feel sorry for you. Valentines are about as far removed from carnage as anything I could conjure up, so that's why I chose the subject for February. Unfortunately I have my doubts of escaping it the next time, for the month certainly has a dubious meaning—March!

Complications

First Little Girl: "I have two brothers and one sister."

Second Little Girl: "I have two sisters and one brother."

Third Little Girl: "I have no brothers and no sisters, but I have two papas by my first mama and three mamas by my second papa."

"So you don't want the green dress?" asked the clerk.

"No, ma'am," replied the large woman of dark complexion. "Ah suttiny don't. Honey, Ah'd look too much like a ton o' coal in a lettuce patch."

A man applied for a job on the railway. He was accepted, and told that he must first learn by heart all the rules of the company.

Having managed this task, he was put on a sleeping-car train to assist the guard. One evening the guard walked along the corridor and saw a red lantern near one of the sleeping berths. He called his assistant.

"What does this mean?" he asked.

"Why," said the new man, "I was only carrying out the rules of the company."

"There's no rule that I know of that tells you to hang a red lantern in the corridor."

The assistant pulled out his book and turned over the pages.

"Rule twenty-seven," he read: "Always hang out a red lantern when the rear end of a sleeper is exposed."

The reason many an old rooster crows before anyone is up is because he doesn't dare open his mouth after the old hen awakens!

Tactful Suggestion

A Negro minister was caught hugging one of the sisters of his flock, and a church inquiry was called. Witnesses testified, and the minister confessed, but defended his actions as proper and authorized by the Bible.

He maintained that as pastor of the flock he had a perfect right to take one of his lambs in his arms.

When the inquiry was finished, a brother offered a resolution:

"We excuse Brother Johnson from all blame, but hereafter when he wants to take one of his lambs in his arms we suggest that he select a ram lamb."

Wife (to late returning husband)—"Is that you, John?' '

John—"It'd better be."

Pardon Me

"Paul is the most bashful man I ever married."

"What makes you say such a thing?"

"He took along mistletoe on our honeymoon."

Officer: "Are you married or single?"

Applicant: "Married."

Officer: "Where were you married?"

Applicant: "I don't know."

Officer: "You don't know where you were married?"

Applicant: "Oh, I thought you said 'why'."

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